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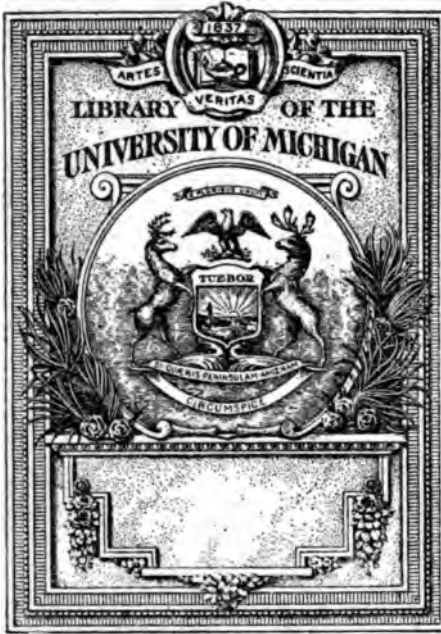
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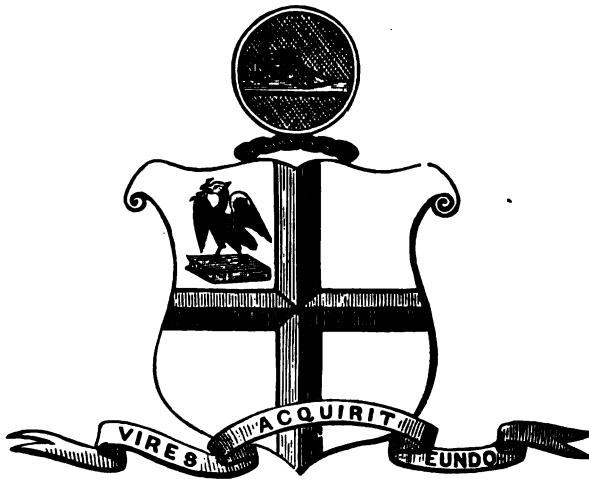
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PROCEEDINGS  
OF THE  
LITERARY AND PHILOSOPHICAL SOCIETY  
OF  
LIVERPOOL,  
DURING THE  
SIXTY-FIRST SESSION, 1871-72.  
No. XXVI;  
WITH INDEX TO VOLS. I. TO XXV.



LONDON:  
LONGMANS, GREEN, READER, & DYER.  
LIVERPOOL:  
DAVID MARPLES, LORD STREET,  
—  
1872.

This Volume has been edited by the Honorary Secretary. It contains an Index to the first twenty-five Volumes, compiled by the Honorary Librarian, and a portion of the Rev. Dr. Ginsburg's paper on the *Ancient Versions of the Bible*.

The Authors have revised their Papers.

The Authors alone are responsible for facts and opinions.

The Society exchanges Proceedings with other publishing bodies through the Librarian, from whom back numbers may be obtained.

## CONTENTS.

---

|                                 | PAGE    |
|---------------------------------|---------|
| COUNCIL .....                   | v       |
| LIST OF MEMBERS .....           | vi      |
| HONORARY MEMBERS.....           | xvii    |
| CORRESPONDING MEMBERS .....     | xix     |
| ASSOCIATES .....                | xx      |
| ADDITIONS TO THE LIBRARY .....  | xxi     |
| BALANCE SHEET .....             | xxviii  |
| ANNUAL MEETING—REPORT .....     | xxix    |
| ELECTION OF COUNCIL .....       | xxxii   |
| RE-ELECTION OF ASSOCIATES ..... | xxxiii  |
| FIRST ORDINARY MEETING .....    | xxxiii  |
| SECOND ORDINARY MEETING .....   | xxxiv   |
| THIRD ORDINARY MEETING .....    | xxxv    |
| FOURTH ORDINARY MEETING .....   | xxxvi   |
| FIFTH ORDINARY MEETING .....    | xxxviii |
| SIXTH ORDINARY MEETING .....    | xxxix   |
| SEVENTH ORDINARY MEETING .....  | xxxix   |
| EIGHTH ORDINARY MEETING .....   | xl      |
| NINTH ORDINARY MEETING.....     | xl      |
| TENTH ORDINARY MEETING.....     | xlii    |
| ELEVENTH ORDINARY MEETING ..... | xlii    |

|                                   | PAGE  |
|-----------------------------------|-------|
| TWELFTH ORDINARY MEETING .....    | xliii |
| THIRTEENTH ORDINARY MEETING ..... | xliv  |
| FOURTEENTH ORDINARY MEETING ..... | xlvi  |

## PAPERS READ.

|  |     |
|--|-----|
| Mr. J. BIRKBECK NEVINS, M.D.—“President’s Address.”...   | 1   |
| Mr. EWING WHITTLE, M.D.—“The Census and its results,<br>as affecting Population Theories.” .....                                 | 27  |
| Mr. G. S. WOOD.—“The Past and Present of Optical<br>Appliances.” .....   | 49  |
| Mr. J. A. PICTON, F.S.A.—“Landmarks in English Consti-<br>tutional History.” .....   | 67  |
| Rev. ALEXANDER GORDON, M.A.—“The Fortunes of a<br>Flemish Mystic.” .....   | 108 |
| Mr. BARON LOUIS BENAS.—“On Some Phases in the<br>History of various Military Nations.” .....                                     | 161 |
| Mr. ALBERT J. MOTT.—“On the Doctrine of Evolution.” ...  | 187 |
| Mr. H. H. STATHAM, Jun., A.R.I.B.A.—“On the Theory<br>and Principles of Architecture, and its Relation to<br>Modern Life.” ..... | 227 |
| Mr. RICHARD C. JOHNSON.—“The Approaching Transits of<br>Venus in 1874 and 1882.” .....   | 255 |
| Mr. WILLIAM UNWIN.—“Madeira as a Sanatorium.” .....  | 271 |
| Rev. W. H. DALLINGER, F.R.M.S.—“Should the Naturalist<br>Recognise a Fourth Kingdom in Nature?” .....                            | 279 |
| Rev. HENRY H. HIGGINS, M.A.—“Notes on the Micro-<br>scopic Characters of Cotton” .....   | 801 |

---

Rev. Dr. GINSBURG.—A portion of his Paper on “The Ancient Versions of the Bible.”

Mr. ALFRED MORGAN.—“Index to the first Twenty-five Volumes of the Society’s Proceedings.”

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ON THE SOCIETY'S ROLL AT THE CLOSE OF THE 61st SESSION,  
CORRECTED TO SEPTEMBER, 1872.

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*Life Members are marked with an Asterisk.*

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- Oct. 11, 1833 Aiken, James, 4, *Gambier-terrace*.  
 Nov. 4, 1867 Allen, John Fenwick, *Windleshaw, St. Helens*.  
 March 7, 1864 Archer, F., jun., B.A., Trin. Coll., Cantab., *Oriel  
Chambers, 14, Water-street*.  
 \*Nov. 28, 1853 Archer, T. C., F.R.S.E., F.R.S.S.A., Director of  
the Industrial Museum, *Edinburgh*.  
 March 4, 1872 Armour, Matthew W., *Woolton Tower, Woolton  
Park, Woolton*.  
 Dec. 14, 1863 Ashe, Theop. Fielding, *Atherton-street, and Moss  
Bank, Lodge-lane*.  
 Feb. 22, 1855 Avison, Thomas, F.S.A., 18, *Cook-street, and  
Fulwood Park, Aigburth*.  
 Jan. 11, 1864 Bagshaw, John, 87, *Church-street, and 26, Bent-  
ley-road, Prince's Park*.  
 May 1, 1854 Bahr, G. W., *Old Castle Buildings, South Castle-  
street, and 2, South-hill Grove, Aigburth*.  
 May 4, 1863 Bailey, Fras. J., M.R.C.S., 51, *Grove-street*.  
 Jan. 18, 1862 Baruchson, Arnold, *Patavia Buildings, Hackins-  
hey, and Blundell Sands, Great Crosby, VICE-  
PRESIDENT*.



- Nov. 15, 1869 Beer, Joseph B. de (A. Baruchson & Co.), *Batavia Buildings, Hackins-hey.*
- March 9, 1857 Bell, Christopher, *Redcross-street*, and 55, *Hamilton-square, Birkenhead.*
- Dec. 10, 1866 Benas, Baron Louis, 5, *South Castle-street.*
- Nov. 14, 1864 Bennett, J. M., *Sir Thomas's Buildings*, and 109, *Shaw-street.*
- Nov. 27, 1865 Biggs, Arthur Worthington, 15, *Tithebarn-street*, and 62, *Falkner-street.*
- Feb. 6, 1872 Biggs, John H. W., 6, *Windsor Buildings, George-street.*
- Nov. 18, 1867 Biggs, Russell H. W., 40, *Castle-street.*
- Oct. 31, 1859 Birch, Jas., *Messrs. Reiss Brothers, The Temple, Dale-street.*
- Jan. 25, 1864 Birchall, James, Governor of the Liverpool Industrial Schools, *Kirkdale*, HON. SECRETARY.
- April 15, 1861 Blake, James, 63, *Kitchen-street*, and 45, *Canning-street.*
- March 9, 1866 Blood, William, *Greta Mount*, 5, *Woodchurch-road, Birkenhead.*
- Nov. 26, 1866 Boulton, Joseph, 15 D, *Exchange Buildings West.*
- \*Mar. 6, 1835 Boulton, Swinton, 1, *Dale-street*, and 71, *Bedford-street South.*
- Oct. 19, 1868 Bower, Anthony, *Vauxhall Foundry*, and *Bowersdale, Seaforth.*
- Nov. 4, 1867 Bramwell, Ed., *Cowley Hill, St. Helens.*
- March 7, 1870 Brandon, Thomas, *Parkfield, Aigburth-road.*
- \*Jan. 8, 1855 Brockholes, James Fitzherbert, *Puddington Old Hall, near Neston.*
- Oct. 31, 1864 Bromham, William, 4, *India Buildings*, and 8, *Montpellier-terrace, Upper Parliament-street.*
- Nov. 12, 1866 Browne, Edgar A., 86, *Bedford-street South.*
- Oct. 18, 1869 Brown, J. Campbell, D.Sc., F.C.S., *School of Medicine, Dover-street.*
- Feb. 4, 1867 Burden, Edward, 123, *Upper Parliament-street.*

- April 18, 1864 Burne, Joseph, *Royal Insurance Office, 1, North John-street, and Higher Tranmere.*
- \*May 1, 1848 Byerley, Isaac, F.L.S., F.R.C.S., *Victoria-road, Seacombe.*
- Feb. 23, 1863 Callon, W. J., M.D., 125, *Islington.*
- Nov. 8, 1862 Cameron, John, M.D., M.R.C.P., Physician to the Southern Hospital, and Lecturer on Medicine at the Royal Infirmary School of Medicine, 17, *Rodney-street.*
- Jan. 25, 1869 Cape, John, 15, *Oxford-street.*
- Jan. 9, 1865 Cariss, Astrup, 40, *Castle-street.*
- March 4, 1872 Carter, W., M.B. Lond., 2, *Elizabeth-street.*
- Dec. 2, 1861 Chadburn, William, 71, *Lord-street.*
- Dec. 1, 1851 Clare, John Leigh, *Borough Buildings, 7, Rumford-street, and Hoylake.*
- Oct. 31, 1859 Clark, Charles H., 17, *North John-street, and Linden House, Rock Ferry.*
- Jan. 26, 1863 Commins, Andrew, LL.D. Dub., *Eldon Chambers, 20, South John-street.*
- Nov. 1, 1869 Cook, C. H. (Lamport & Holt), *Drury Buildings, 21, Water-street, and Blundell-sands.*
- Oct. 18, 1869 Cook, Henry James, *Byrom-street, and Burbo House, Blundell-sands.*
- Oct. 6, 1863 Crosfield, Wm., jun., 28, *Temple-court, and Alexandra-drive, Ullet-road.*
- Feb. 6, 1872 Cudlipp, Ralph B., 124, *Bedford-street.*
- Nov. 26, 1866 Curtis, Rev. F. H., M.A. Oxon., *The College, Shaw-street.*
- Feb. 8, 1864 Cuthbert, J. R., 40, *Chapel-street, and White House, Out-lane, Woolton.*
- Dec. 14, 1868 Daly, Dennis, 28, *Brunswick-street.*
- Jan. 24, 1870 Dallinger, Rev. W. H., 10, *Green Lawn, Rock Ferry.*
- Nov. 12, 1866 Davies, E., F.C.S., *The Laboratory, Royal Institution, Colquitt-street.*

- Nov. 2, 1868 Dawbarn, William, *The Temple, Dale-street, and Mosley-hill.*
- Oct. 1, 1866 Dawson, Thomas, 26, *Rodney-street.*
- Jan. 8, 1872 Deane, Charles Courtenay, 8, *York Buildings, 14, Dale-street, and Blundell-sands.*
- March 9, 1868 Dixon, W., *Somerville House, Poulton-road, Seacombe.*
- Nov. 27, 1868 Dove, John M., *Royal Insurance Office, and Claughton.*
- Jan. 28, 1848 Drysdale, John James, M.D. Edin., M.R.C.S. Edin., 36, *Rodney-street.*
- Feb. 4, 1856 Duckworth, Henry, F.L.S., F.R.G.S., F.G.S., 32, *Brown's Buildings, Exchange-street W.*
- \*Nov. 27, 1848 Edwards, John Baker, Ph.D. Gies., F.C.S., Professor Medical Faculty of Bishop's College, Montreal.
- Mar. 21, 1870 Edwards, Edward E. (Smith, Edwards & Co.), *Adelaide Buildings, 4, Chapel-street.*
- Feb. 24, 1868 Elliot, John, 85, *Peter's-lane.*
- April 7, 1862 English, Charles J., 26, *Chapel-street, and 26, Falkner-square.*
- \*Dec. 18, 1852 Ferguson, William, F.L.S., F.G.S., 4, *South John-street, and 2, St. Aidan's-terrace, Birkenhead.*
- Feb. 9, 1868 Finlay, William, Senior Mathematical Master, Middle School, *Liverpool College, and 111, Shaw-street.*
- Oct. 1, 1866 Fletcher, Alfred E., F.C.S., H. M. Inspector of Alkali Works, for the Western District, 21, *Overton-street, Edge-hill.*
- Feb. 20, 1871 Footner, Harry, C.E., 121, *Chatham-street, E., and Line-street Station.*
- \*Mar. 19, 1855 Ford, James Thomas, 5, *Essex-ct., Temple, E.C.*
- \*Feb. 6 1854 Gee, Robert, M.D. Heidelb., M.R.C.P., Lecturer on Diseases of Children, Royal Infirmary School of Medicine; Physician, Workhouse Hospital; 5, *Abercromby-square.*

- Dec. 2, 1861 Graves, Samuel R., M.P., *Baltic-buildings, and The Grange, Wavertree.*
- Nov. 14, 1853 Greenwood, Henry, 32, *Castle-street, and Stanley Park.*
- Jan. 22, 1855 Hakes, James, M.R.C.S., Surgeon to the Northern Hospital, 80, *Hope-street.*
- \*Jan. 21, 1856 Hardman, Lawrence, 35, *Rock Park, Rock Ferry.*
- Nov. 15, 1869 Hartwig, Estevan H. L., 62, *Palmaille, Altona, Hamburg.*
- Feb. 6, 1865 Hassan, Rev. E., *Alma-terrace, Sandown-lane.*
- Nov. 13, 1865 Hayward, John Williams, M.D., 117, *Grove-street.*
- Feb. 6, 1865 Hebson, Douglas, 13, *Tower-chambers, and 53, Bedford-street South.*
- Dec. 28, 1846 Higgins, Rev. H. H., M.A. Cantab., F.C.P.S., *Rainhill, Ex-PRESIDENT.*
- \*Oct. 31 1836 Higginson, Alfred, M.R.C.S., Surgeon Royal Southern Hospital, 44, *Upper Parliament-street, VICE-PRESIDENT.*
- Mar. 22, 1869 Higgin, Thomas, 33, *Tower-buildings, and Huyton.*
- Feb. 20, 1871 Highfield, Samuel, *Manor-road, Liscard.*
- April 29, 1872 Hiles, Joseph (Johnson, Walker & Co.), *The Albany, and Walmer-terrace, Great Crosby.*
- Nov. 16, 1863 Holden, Adam, 48, *Church-street, and 2, Carlton-terrace, Milton-road.*
- March 9, 1868 Holme, James, jun., 109, *Mount Pleasant.*
- \*Dec. 14, 1862 Holt, Robert Durning, 6, *India-buildings, and 29, Edge-lane.*
- \*Nov. 13, 1854 Hunter, John, Member Hist. Society, Pennsylvania, *Halifax, Nova Scotia.*
- Jan. 26, 1857 Hutton, David, 3, *St. George's-crescent, and 61, Canning-street.*
- \*April 29, 1850 Ihnc, William, Ph.D. Bonn, *Villa Felseck, Heidelberg, Ex-PRESIDENT.*
- Feb. 23, 1857 Imlach, Henry, M.D. Edin., 1, *Abercromby-square.*

- \*Oct. 21, 1844 Inman, Thomas, M.D. Lond., M.R.C.P., Consulting Physician, Royal Infirmary, 12, *Rodney-street*, **EX-PRESIDENT.**
- Mar. 18, 1872 Jackson, F. W., 32, *Falkner-street*.
- Nov. 28, 1864 Jeffery, F. J.
- Mar. 10, 1862 Johnson, Richard, *Queen Insurance-buildings*, and *Blundell-sands*.
- Jan. 26, 1863 Johnson, Richard C., *Queen Insurance-buildings*, and *Blundell-sands*.
- Feb. 24, 1868 Jones, Charles W., *The Nook, Gateacre*.
- Nov. 26, 1866 Jones, Edward, B.A., Head Master of Hibernian School, *Mount Pleasant*.
- \*April 4, 1852 Jones, Morris Charles, F.S.A., F.S.A. Scot., 20, *Abercromby-square*.
- May 5, 1851 Jones, Roger Lyon, *Liverpool and London-chambers*, *Exchange*, and 6, *Sunnyside, Prince's Park*.
- Oct. 18, 1869 Jones, Wm. Bolton, 21, *South Castle-street*.
- Oct. 2, 1865 Kendal Robinson, 16, *Water-street*, and 178, *Bedford-street*.
- Nov. 12, 1866 Kennedy-Moore, Rev. W., M.A., 151, *Canning-street*.
- Nov. 15, 1869 Kent, W. K., 12, *Manor-terrace, Amherst-road, Hackney, London, N.E.*
- Nov. 15, 1869 King, Jos., 13, *Exchange-alley, W.*, and *Treleaven House, Blundell-sands*.
- Nov. 1, 1869 Kinsman, W. N., 8, *Derwent-road, Stonycroft*.
- Jan. 10, 1848 Lampport, William James, 21, *Water-street*, and *New Brighton*.
- \*Jan. 14, 1839 Lassell, William, F.R.SS. L. and E., F.R.A.S., 27, *Milton-street*, and 58, *Wapping*.
- Oct. 21, 1844 Lear, John, 14, *Cook-street*, and 22, *Holland-terrace, Marmaduke-street, Edge Hill*.
- Dec. 11, 1871 Leigh, Richmond, M.R.C.S. E., 2, *Shaw-street*.
- Nov. 2, 1868 Lloyd, James, Vice-Consul, Argentine Confederation, 150, *Chatham-street*.

- \*Oct. 21, 1844 M'Andrew, Robert, F.R.S., F.L.S., *Isleworth House, Isleworth, London*, **EX-PRESIDENT.**
- April 17, 1865 MacCheane, Wm., M.R.C.S., 47, *Shaw-street.*
- Oct. 4, 1869 Macalister, W. B. (National Steam Ship Co., Water-street), 18, *Alexandra-terrace, Prince's-road.*
- April 20, 1868 Marples, David, 50B, *Lord-street*, and *Sandon-terrace, 119, Oxton-road, Birkenhead.*
- Nov. 14, 1870 Marples, Joseph, 23, *Leece Street*, and *Fernlee, 51, Whetstone-lane, Tranmere.*
- Feb. 24, 1868 Marsh, John, *Rann Lee, Rainhill.*
- Jan. 21, 1839 Martin, Studley, 27, *Brown's-buildings*, and 177, *Bedford-street South.*
- Feb. 20, 1871 Mason, A. H., 317, *Upper Parliament-street.*
- Feb. 5, 1844 Mayer, Joseph, F.S.A., F.R.A.S., F.E.S., 68, *Lord-st.*, and *Pennants House, Lower Bebington.*
- \*Oct. 21, 1867 Muspratt, E. K., *Seaforth Hall, Seaforth.*
- Oct. 31, 1859 Moore, Thomas John, Corr. Mem. Z.S., Curator Free Public Museum, *William Brown-street*, **VICE-PRESIDENT.**
- Nov. 2, 1868 Moore, J. Murray, M.D. Edin., 6, *Oxford-street.*
- Nov. 15, 1869 Morgan, Alfred, 2, *Rathbone-terrace, Wellington-road, Wavertree*, **HON. LIBRARIAN.**
- Jan. 8, 1855 Morton, George Highfield, F.G.S., 9, *London-road.*
- April 16, 1849 Moss, Rev. John James, B.A., *Upton, Cheshire.*
- Oct. 29, 1850 Mott, Albert Julius, 32, *Church-street*, and *Claremont House, Seaforth*, **HON. TREASURER.**
- April 8, 1854 Mott, Charles Grey, 27, *Argyle-street, Birkenhead*, and *Cavendish-road, Birkenhead Park.*
- Nov. 27, 1865 Mountfield, William B., 12, *St. James's road.*
- Nov. 2, 1868 M'Coskry, W., 14, *Cook-street.*
- Mar. 21, 1870 M'Quie, P. B., 12, *Preeson's-row*, and *Blundell Sands.*
- Oct. 20, 1865 Nevins, John Birkbeck, M.D. Lond., M.R.C.S., Lecturer on *Materia Medica*, *Royal Infirmary*

School of Medicine, 8, *Abercromby-square*,  
PRESIDENT.

- April 7, 1862 Newlands, A., 5, *Brown's-buildings*, and 46, *Catherine-street*.
- Feb. 6, 1865 Newton, John, M.R.C.S., 20, *Marmaduke-street*, *Edge Hill*.
- Nov. 2, 1868 Norrie, Rev. B. A. W., M.A. Cantab., *Rainhill*.
- \*Oct. 15, 1855 North, Alfred, 23, *Lansdowne-crescent*, *Notting-hill*, *London, W.*
- Nov. 18, 1861 Nugent, Rev. James, 1, *Hornby-road*, *Walton*.
- Dec. 10, 1866 Owen, Peter (Farnworth & Jardine), *Liverpool and London-chambers*.
- Feb. 21, 1870 Packer, James Macnamara, M.D., *Rose Cottage*, *Poplar Bank*, *Huyton*.
- Jan. 9, 1871 Patterson, John, 16, *Devonshire-road*, *Prince's Park*.
- Feb. 20, 1871 Pendlebury, Richard, B.A., *Fellow of St. John's College*, *Cambridge*.
- Nov. 4, 1861 Philip, Thomas D., 48, *South Castle-street*, and *Holly-road*, *Fairfield*.
- Dec. 28, 1846 Picton, James Alanson, F.S.A., Chairman of the Library and Museum Committee, 11, *Dale-street*, and *Sandy-knowe*, *Wavertree*, **EX-PRESIDENT**.
- Mar. 8, 1869 Parratt, Thos. P., 8, *Belvidere-road*, *Prince's-park*.
- April 30, 1866 Prag, Rev. Jacob, 85, *Mount-street*.
- Mar. 18, 1872 Pringle, Adam, *Grove-park*.
- Nov. 18, 1871 Proctor, Peter, M.R.C.S., and L.S.A. Lond., 18, *St. James's-road*.
- \*Jan. 22, 1866 Raffles, William Winter, 54, *Brown's-buildings*, and *Sunnyside*, *Prince's Park*.
- Nov. 12, 1860 Rathbone, Philip H., *Liverpool and London Chambers* (H), and *Greenbank-cottage*, *Wavertree*.
- Mar. 24, 1862 Rathbone, Richard Reynolds, 17, *Lancaster-buildings*, *Tithebarn-street*, and *Beechwood House*, *Grassendale*.



- \*Jan. 7, 1856 Rawlins, Charles Edward, jun., 12, *Rumford-court*,  
*Rumford-place*, and *Rock Mount*, *Rainhill*.
- Jan. 9, 1870 Rawlins, Gerald W., *Brook Cottage*, *Rainhill*.
- Oct. 17, 1870 Rayner, Joseph, Town Clerk, *Municipal Offices*,  
*Dale-street*.
- \*Nov. 17, 1851 Redish, Joseph Carter, 6, *Dingle-lane*.
- Dec. 12, 1870 Rickard, Wm., LL.D., *Alverton House*, 86, *Upper*  
*Parliament-street*.
- Nov. 29, 1869 Roberts, Isaac, F.G.S., 26, *Rock Park*, *Rock*  
*Ferry*.
- Feb. 4, 1867 Robinson, Joseph F., 9, *Orange-court*.
- Oct. 4, 1869 Rogers, J. Frederick (Dart & Rogers), *The Temple*,  
*Dale-street*, and 8, *Onslow-road*.
- Dec. 18, 1869 Roulston, Robt. W., 44, *Castle-street*.
- April 18, 1854 Rowe, James, 16, *South Castle-street*, and 105,  
*Shaw-street*.
- Jan. 22, 1872 Russell, Edward R., *Daily Post*, *Lord-street*, and  
53, *Bedford-street*, *E*.
- Feb. 20, 1865 Samuel, Albert H. (Evans, Son, & Co.), 56,  
*Hanover-street*, and *Canning-terrace*, *Upper*  
*Parliament-street*.
- April 7, 1862 Samuel, Harry S., 11, *Orange-court*, and 2,  
*Canning-street*.
- Mar. 19, 1866 Sephton, Rev. John, M.A., *Liverpool Institute*.
- Nov. 2, 1868 Sharp, Charles, *Liverpool Institute*.
- Nov. 16, 1863 Sheldon, E. M., M.R.C.S., 223, *Boundary-street*.
- Oct. 29, 1866 Shimmin, Hugh, 56, *Cable-street*, and *Tue Brook*,  
*West Derby*.
- Nov. 2, 1863 Skillicorn, John E., 7, *The Willows*, *Breck-road*.
- Nov. 7, 1864 Skinner, Thomas, M.D. Edin., *Dunedin House*,  
64, *Upper Parliament-street*.
- Feb. 23, 1863 Smith, J. Simm, *Royal Insurance Office*, *North*  
*John-street*.
- Dec. 10, 1866 Smith, Elisha, (Henry Nash & Co.), 5, *India-*  
*buildings*.
- April 4, 1870 Smith, James, 11, *Lord-street*.

- Feb. 24, 1862 Snape, Joseph, Lecturer on Dental Surgery, Royal Infirmary School of Medicine, 75, *Rodney-street*.
- Nov. 12, 1860 Spence, Charles, 4, *Oldhall-street*.
- Feb. 10, 1862 Spence, James, 18, *Brown's-buildings, Exchange,* and 10, *Abercromby-square*.
- Nov. 27, 1865 Spola, Luigi, LL.D., 85, *Boundary-lane, West Derby-road*.
- Nov. 29, 1869 Statham, H. H., jun., 5, *Batavia-buildings, Hackins Hey*.
- Jan. 18, 1868 Stearn, C. H., 3, *Eldon-terrace, Rock Ferry*.
- Dec. 14, 1857 Steele, Robert Topham, 4, *Water-street,* and *Wavertree*.
- Jan. 9, 1865 Stewart, Robert E., L.D.S., R.C.S., Dental Surgeon, Royal Southern Hospital, and Liverpool Dental Hospital, 37, *Rodney-street*.
- Oct. 18, 1858 Stuart, Richard, 11, *Manchester-buildings,* and *Brooklyn Villa, Breeze-hill, Walton*.
- \*Feb. 19, 1865 Taylor, John Stopford, M.D. Aberd., F.R.G.S., 1, *Springfield, St. Anne-street*.
- Jan. 23, 1843 Taylor, Robert Hibbert, M.D. Edin., L.R.C.S. Ed. Lect. on Ophthalmic Medicine, Royal Infirmary School of Medicine, 1, *Percy-street*.
- Nov. 17, 1850 Tinling, Chas., 44, *Cable-street,* and 29, *Onslow-road, Elm Park*.
- Dec. 1, 1851 Towson, John Thomas, F.R.G.S., Scientific Examiner, Sailors' Home, 47, *Upper Parliament-street*.
- Jan. 7, 1867 Trimble, Robt., *Cuckoo-lane, Little Woolton*.
- \*Feb. 19, 1844 Turnbull, James Muter, M.D. Edin., M.R.C.P., Physician Royal Infirmary, 86, *Rodney-street*.
- Oct. 21, 1861 Unwin, William Andrew, 11, *Rumford-place*.
- Oct. 21, 1844 Vose, James Richard White, M.D. Edin., F.R.C.P., Physician Royal Infirmary, 5, *Gambier-terrace*.
- Mar. 18, 1872 Walker, George E., F.R.C.S., 58, *Rodney-street*.
- Mar. 18, 1861 Walker, Thomas Shadford, M.R.C.S., 82, *Rodney-street*.

- Jan. 27, 1862 Walmsley, Gilbert G., 50, *Lord-street*.  
Jan. 9, 1865 Walthew, William, *Phœnix Chambers*, and *Vine Cottage, Aughton*.  
Mar. 4, 1872 Ward, Thos., 82, *Erskine-street*.  
Dec. 18, 1869 Waterhouse, Harold, 87, *Catherine-street*.  
Dec. 2, 1861 Weightman, William Henry, *Minster-buildings, Church-street*, and *Cambridge-road, Seaforth*.  
April 7, 1862 Whittle, Ewing, M.D., Lecturer on Medical Jurisprudence, Royal Infirmary School of Medicine, 77A, *Upper Parliament-street*.  
Jan. 18, 1868 Whitworth, Rev. W. A., M.A., 185, *Islington*.  
Jan. 8, 1872 Williams, Wellington A., 88, *Canning-street, E.*  
Mar. 18, 1861 Wood, George S. (Messrs. Abraham & Co.), 20, *Lord-street*, and *Bellevue-road, Wavertree*.  
Nov. 14, 1870 Wood, W. (Messrs. Abraham & Co.), 20, *Lord-st.*  
Nov. 14, 1870 Wood, John J. (Messrs. Abraham & Co.), 20, *Lord-street*.  
Oct. 17, 1870 Woodburn, Thos., 18, *Law Association Buildings*, 18, *Harrington-street, W.*

## HONORARY MEMBERS.

## LIMITED TO FIFTY.

- 1.—1827 Rev. William Hincks, F.R.S.E., F.L.S., Professor of Natural History in University College, *Toronto, C.W.*
- 2.—1838 The Right Hon. Dudley Ryder, Earl of Harrowby, K.G., D.C.L., F.R.S., *Sandon-hall, Staffordshire*, and 89, *Grosvenor-square, London, W.*
- 3.—1836 The Most Noble William, Duke of Devonshire, K.G., M.A., F.R.S., F.G.S., &c., Chancellor of the University of Cambridge, *Devonshire House, London, W.*, and *Chatsworth, Derbyshire.*
- 4.—1838 George Biddell Airy, M.A., D.C.L., F.R.S., Hon. F.R.S.E., Hon. M.R.I.A., V.P.R.A.S., F.C.P.S., &c., Astronomer Royal, *Royal Observatory, Greenwich.*
- 5.—1840 James Nasmyth, F.R.A.S., *Penshurst, Kent.*
- 6.—1840 Richard Duncan Mackintosh, L.R.C.P., *Exeter.*
- 7.—1841 Charles Bryce, M.D. Glasg., Fell.F.P.S.G., *Brighton.*
- 8.—1844 T. P. Hall, *Coggleshall, Esser.*
- 9.—1844 Peter Rylands, *Warrington.*
- 10.—1844 John Scouler, M.D. LL.D., F.L.S., *Glasgow.*
- 11.—1844 Thomas Rymer Jones, F.R.S., F.Z.S., F.L.S., Professor of Comparative Anatomy, *King's College, London.*
- 12.—1844 Sir Charles Lemon, Bart., M.A. Cantab., F.R.S., F.G.S., *Penryn, Cornwall.*
- 13.—1844 William Carpenter, M.D. Edin., F.R.S., F.L.S., F.G.S., Registrar, *London University.*
- 14.—1848 Rev. Thomas Corser, M.A., *Strand, Bury.*

- 15.—1850 Rev. St. Vincent Beechy, M.A. Cantab., *Worsley, near Eccles.*
- 16.—1851 James Smith, F.R.SS.L. and E., F.G.S., F.R.G.S., *Jordan-hill, Glasgow.*
- 17.—1851 Henry Clarke Pidgeon, *London.*
- 18.—1851 Rev. Robert Bickersteth Mayor, M.A., Fell. of St. John's College, Cantab., F.C.P.S., *Rugby.*
- 19.—1852 William Reynolds, M.D., *Coed-du, Denbighshire.*
- 20.—1853 Rev. James Booth, LL.D., F.R.S., &c., *Stone, near Aylesbury.*
- 21.—1857 Thomas Jos. Hutchinson, F.R.G.S., F.R.S.L., F.E.S., H.B.M. Consul, *Callao, Peru.*
- 22.—1861 Louis Agassiz, Professor of Natural History in Harvard University, *Cambridge, Massachusetts.*
- 23.—1861 Sir William Fairbairn, Bart., LL.D., C.E., F.R.S., *Polygon, near Manchester.*
- 24.—1861 Rev. Thomas P. Kirkman, M.A., F.R.S., *Croft Rectory, Warrington.*
- 25.—1862 The Right Rev. H. N. Staley, D.D., Bishop of Honolulu, *Sandwich Islands.*
- 26.—1863 Edward J. Reed, *Hyde Vale, Greenwich, S.E.*
- 27.—1865 John Edward Gray, Ph. D., F.R.S., &c., *British Museum.*
- 28.—1865 George Rolleston, M.D., F.R.S., Linacre Professor of Physiology in the University of Oxford, *Oxford.*
- 29.—1865 Cuthbert Collingwood, M.A. and M.B. Oxon, F.L.S.
- 30.—1867 J. W. Dawson, LL.D., F.R.S., F.G.S., &c., Principal and Vice-Chancellor of McGill University, *Montreal.*
- 31.—1868 Captain Sir James Anderson, *Atlantic Telegraph Company, London.*
- 32.—1870 Sir John Lubbock, Bart., M.P., F.R.S., *High Elms, Farnborough, Kent.*
- 33.—1870 Henry E. Roscoe, F.R.S., Professor of Chemistry in Owen's College, *Manchester.*

CORRESPONDING MEMBERS.

xix

- 84.—1870 Professor Joseph Henry, Secretary to the Smithsonian Institute, *Washington, U.S.*
- 85.—1870 Professor Wyville Thompson, F.R.S., *Belfast.*
- 86.—1870 Joseph Hooker, M.D., F.R.S., *Royal Observatory, Kew.*
- 87.—1870 Professor Brown-Séquard, M.D.
- 88.—1870 John Gwyn Jeffreys, F.R.S., 25, *Devonshire-place, Portland-place, London.*
- 89.—1870 Thos. H. Huxley, LL.D., F.R.S., Professor of Natural History in the Royal School of Mines, *Jermyn-street*, and 26, *Abbey-place, St. John's-wood, London.*
- 40.—1870 John Tyndall, LL.D., F.R.S., Professor of Natural Philosophy in the Royal Institution, *London.*
- 41.—1870 Rev. Christian D. Ginsburg, LL.D., *Binfield, Bracknell, Berks.*
- 42.—1870 Professor W. J. M. Rankine, F.R.S., *Glasgow University.*

CORRESPONDING MEMBERS.

LIMITED TO THIRTY-FIVE.

- 1.—1867 Albert C. L. G. Günther, M.A., M.D., Ph.D., British Museum, Editor of the "*Zoological Record.*"
- 2.—1867 J. Yate Johnson, *London.*
- 8.—1867 R. B. N. Walker, *Gaboon, West Africa.*
- 4.—1868 Rev. J. Holding, M.A., F.R.G.S., *London.*
- 5.—1868 Geo. Hawkins, *Colombo, Ceylon.*
- 6.—1868 J. Lewis Ingram, *Bathurst, River Gambia.*
- 7.—1869 Geo. Mackensie, *Cebu, Philippine Islands.*
- 8.—1870 Rev. Joshua Jones, D.C.L., King William's College, *Isle of Man.*

## ASSOCIATES.

## LIMITED TO TWENTY FIVE.

- 1.—Jan. 27, 1862 Captain John H. Mortimer, "America,"  
(Atlantic.)
- 2.—Mar. 24, 1862 Captain P. C. Petrie, "City of London,"  
Commodore of the Inman Line of American  
Steam Packets. (Atlantic.)
- 3.—Feb. 9, 1863 Captain James P. Anderson, R.M.S.S.  
"Africa," Cunard Service. (Atlantic.)
- 4.—Feb. 9, 1863 Captain John Carr (Bushby and Edwards),  
ship "Scindia." (Calcutta.)
- 5.—Feb. 9, 1863 Captain Charles E. Price, R.N.R. (L. Young  
and Co.), ship "Cornwallis." (Calcutta and  
Sydney.)
- 6.—April 20, 1863 Captain Fred. E. Baker, ship "Nippon."  
(Chinese Seas.)
- 7.—Oct. 31, 1864 Captain Thomson, ship "Admiral Lyons."  
(Bombay.)
- 8.—Oct. 31, 1864 Captain Alexander Browne (Papayanni),  
S.S. "Agia Sofia." (Mediterranean.)
- 9.—April 18, 1865 Captain Alexander Cameron (Boult, English  
and Brandon), ship "Staffordshire." (Shang-  
hai.)
- 10.—Dec. 11, 1865 Captain Walker, ship "Trenton."
- 11.—Mar. 23, 1868 Captain David Scott.
- 12.—Oct. 5, 1868 Captain Cawne Warren.
- 13.—Oct. 5, 1868 Captain Perry.
- 14.—Mar. 22, 1869 Captain Robert Morgan, ship "Robin Hood."
- 15.—April 29, 1872 Captain J. B. Walker, Old Calabar.
- 16.—April 29, 1872 Captain Alfred Horsfall, S.S. "Canopus."



**OCTOBER 16th.**

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|---|---|
| Journal, Royal Geographical Society, vol. 11 . . . . .                              | <i>The Society.</i>                             |
| Proceedings, Royal Geographical Society, vol. 15, nos. 1 and 2 . . . . .            | <i>The Society.</i>                             |
| Proceedings, Royal Society, vol. 19, nos. 127 and 128 . . . . .                     | <i>The Society.</i>                             |
| Proceedings, Zoological Society, 1870, parts 1, 2, and 8 ; 1871, part 1 . . . . .   | <i>The Society.</i>                             |
| Journal, Statistical Society, March, June, and September, 1871 . . . . .            | <i>The Society.</i>                             |
| Journal, Linnæan Society, vol. 11, Zoology, nos. 51, 52 ; Botany, 65, 66 . . . . .  | <i>The Society.</i>                             |
| Proceedings, Society of Antiquaries, vol. 5, no. 1 . . . . .                        | <i>The Society.</i>                             |
| Report of the British Association, Liverpool Meeting, 1871 . . . . .                | <i>Dr. Inman.</i>                               |
| Natural History Transactions of Northumberland and Durham, vol. 4, part 1 . . . . . | <i>Nat. Hist. Society of North. and Durham.</i> |
| Proceedings, Philosophical Society of Glasgow, 1870-71 . . . . .                    | <i>The Society.</i>                             |
| Journal of the Anthropological Institute, vol. 1, no. 1 . . . . .                   | <i>The Society.</i>                             |
| Monthly Notices, Royal Astronomical Society, March to June . . . . .                | <i>The Society.</i>                             |
| Journal, Chemical Society, April to August, 1871 . . . . .                          | <i>The Society.</i>                             |
| Annual Report, &c., Plymouth Institution, 1870-71 . . . . .                         | <i>The Society.</i>                             |

- Annual Report, Royal Cornwall Polytechnic Society, 1870 . . . . . *The Society.*  
 Proceedings, Meteorological Society, March to April . . . . . *The Society.*  
 Temperature of the British Islands, by Alex. Buchan, M.A., Secretary Scottish Meteorological Society : . . . . *The Author.*  
 Journal, Scottish Meteorological Society, July, 1871 . . . . . *The Society.*
- 

## OCTOBER 30th.

- Medico-Chirurgical Transactions, Index to vols. 1-53 . . . . . *The Society.*  
 Journal, Society of Arts, 960-985 . . . . *The Society.*  
 Clarke's Ante-Nicene Library :  
   Arnobius Gregory Thaumaturgus, &c. *R. A. Macfie, Esq., M.P.*  
 Journal, Franklin Institute, January to August, 1871 . . . . . *The Institute.*  
 Smithsonian Report, 1869 . . . . . *The Institute.*  
 Transactions, American Philosophical Society, vol. 14, part 1 . . . . . *The Society.*  
 Proceedings of American Philosophical Society, vol. 11, 83-85. . . . . *The Society.*  
 Smithsonian Contributions, vol. 17 . . . *The Institute.*  
 Congressional Directory, U.S., 1871 . . *U. S. Government.*  
 Proceedings, American Academy of Arts and Sciences . . . . . *The Academy.*  
 Announcement of the Wagner Free Institute of Science, 1870-71 . . . . . *The Institute.*  
 Bulletin, Essex Institute, May, 1870 . . *The Institute.*  
 Proceedings of Essex Institute, May, 1870 . *The Institute.*  
 The Eared Seals of the North Pacific, from Harvard College, Mass. . . . . *The College.*  
 Crustacea, dredged in the Gulf Stream, from Harvard College, Mass. . . . . *The College.*

- Mammals and Winter Birds of East Florida,  
from Harvard College, Mass. . . . . *The College.*  
Transactions, Connecticut Academy of Arts and  
Sciences . . . . . *The Academy.*  
Proceedings, Boston Natural Historical Society,  
August, 1870 . . . . . *The Society.*  
On the Earthquakes in New England, 1688–  
1869 . . . . . *Canadian Society.*  
Canadian Journal, May and August, 1871 *Canadian Institute.*  
Journal, Polytechnic Society, Liverpool . . . *The Society.*  
Proceedings, Liverpool Architectural and  
Archæological Society . . . . . *The Society.*  
Clinical Society, Transactions, vol. 4 . . . *The Society.*  
Verhandlungen des Vereins für Natur und  
Heilkunde, zu Presburg, 1869–70 . . . *The Society.*  
Discorso del Conim, Cristofaro Negri, Pres.  
Società Geografica Italiana, 1871 . . . *The Society.*  
Greenwich Observations, 1869 . . . *H. M. Government.*

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NOVEMBER 13th.

- Memoirs de la Société des Sciences Naturelles  
de Cherbourg, tome 15 . . . . . *The Society.*  
Journal, Anthropological Institute, vol. 1, no. 2 *The Institute.*  
Life, and the Equivalence of Force, part 2, by  
Dr. Drysdale . . . . . *The Author.*  
Journal, Linnæan Society, vol. 10, no. 53 . . *The Society.*  
Proceedings, Meteorological Society, vol. 5, no.  
56 . . . . . *The Society.*  
Monthly Notices, Royal Astronomical Society . *The Society.*  
Communications to the Yorkshire Philosophical  
Society . . . . . *The Society.*  
Journal, Chemical Society, 1870 . . . *The Society.*  
Proceedings, Royal Institution of Great Britain,  
nos. 54 and 55 . . . . . *The Society.*

- Journal, Royal Institution of Cornwall, April,  
1871 . . . . . *The Institute.*  
Proceedings, Royal Geographical Society, vol.  
15, nos. 3 and 4 . . . . . *The Society.*  
U. S. Patent Office Reports, 1868, vols. 1, 2, 3,  
and 4 . . . . . *U. S. Government.*  
Journal, Society of Arts, no. 986 . . . . . *The Society.*  
Two Papers, by Dr. Collingwood, on a New  
Form of Cephalopodous Ova, and List of  
Birds collected by him in the China and  
Japanese Seas . . . . . *The Author.*
- 

## DECEMBER 11th.

- Annual Report, Leeds Philosophical and  
Literary Society, 1870-71 . . . . . *The Society.*  
Report, Geological and Polytechnic Society of  
the West Riding of Yorkshire, 1870 . . . . . *The Society.*  
Journal of the Society of Arts, nos. 990-998 . . . . . *The Society.*  
Transactions, Connecticut Academy of Arts and  
Sciences, vol. 2, part 1 . . . . . *The Academy.*  
Proceedings, Literary and Philosophical Society  
of Manchester, October and November . . . . . *The Society.*  
Journal, Liverpool Polytechnic Society . . . . . *The Society.*  
Journal, Chemical Society, October . . . . . *The Society.*  
Proceedings, Liverpool Geological Society,  
1870-71 . . . . . *The Society.*  
Contributions from the University of Christiania *The University.*  
Proceedings, American Philosophical Society,  
July, 1871 . . . . . *The Society.*  
Report of the Manchester Free Libraries, 1870-  
71 . . . . . *Mayor & Corporation of Manchester.*  
Proceedings, Liverpool Architectural and  
Archæological Society, October . . . . . *The Society.*
-

**FEBRUARY 5th.**

- Journal, Franklin Institute, November and  
December, 1871 . . . . . *The Institute.*  
Journal, Chemical Society, December, 1871 . . *The Society.*  
Monthly Notices, Royal Astronomical Society,  
December . . . . . *The Society.*  
Journal, Statistical Societies, December . . *The Society.*  
Journal, Society of Arts, nos. 991-1001 . . *The Society.*  
Proceedings, Literary and Philosophical Society  
of Manchester . . . . . *The Society.*  
Journal, Liverpool Polytechnic Society . . *The Society.*  
Remarks on the Inaugural Address read before  
the Liverpool Geological Society, by C. Potter . *The Author.*  
Reale Institute Lombardo, Memorie, vols. 11  
and 12 . . . . . *The Institute.*  
Reale Institute Lombardo, Rendiconti, vols. 2  
and 8 . . . . . *The Institute.*  
Reale Institute Lombardo, Rapporti sui Pro-  
gressi delle Scienze, del Dr. L. Gabba . *The Institute.*
- 

**FEBRUARY 19th.**

- Journal of the Society of Arts, nos. 1002 and  
1008 . . . . . *The Society.*  
Journal, Liverpool Polytechnic Society . . *The Society.*  
Journal, Franklin Institute, January . . *The Institute.*  
Monthly Notices, Royal Astronomical Society,  
January . . . . . *The Society.*  
Journal, Chemical Society, January . . *The Society.*  
Proceedings, Society of Antiquaries, vol. 5, no.  
2 . . . . . *The Society.*  
Annual Report of the Trustees of the Museum  
of Comparative Zoology, Harvard College,  
U. S., 1870 . . . . . *The College.*

- Bulletins de la Society Antiquaries de l' ouest,  
 1871 . . . . . *The Society.*  
 Proceedings, Liverpool Architectural and  
 Archæological Society . . . . . *The Society.*
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### MARCH 18th.

- Journal of the Society of Arts, nos. 1004–1006 *The Society.*  
 Proceedings of the Literary and Philosophical  
 Society of Manchester . . . . . *The Society.*  
 Journal, Franklin Institute, February, 1872 . *The Institute.*  
 Canadian Journal of Industry, Science, and  
 Art, February, 1872 . . . . . *Canadian Institute.*  
 Journal, Linnæan Society, March, 1872 . . . *The Society.*  
 Monthly Notices, Royal Astronomical Society,  
 February, 1872 . . . . . *The Society.*  
 Report and Proceedings, Liverpool Numismatic  
 Society, 1871 . . . . . *The Society.*  
 Proceedings, Liverpool Architectural and  
 Archæological Society, December, 1871 . *The Society.*  
 A Glance at the Position and Prospects of the  
 Empire, by R. A. Macfie, Esq., M. P. . . . *The Author.*  
 Patent Office Reports, 4 vols. . . . . *U. S. Government.*  
 Proceedings, Royal Society, vol. 20, no. 181 . *The Society.*
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### APRIL 15th.

- Journal of the Society of Arts, 1004–1011 . *The Society.*  
 Proceedings, Literary and Philosophical Society  
 of Manchester . . . . . *The Society.*  
 Journal, Chemical Society, February and  
 March . . . . . *The Society.*  
 Journal, Statistical Society, March . . . . *The Society.*  
 Proceedings, Royal Geographical Society,  
 December . . . . . *The Society.*

|   |                         |
|---|-------------------------|
| Journal, Anthropological Institute, January . . . . .                               | <i>The Institute.</i>   |
| Journal, Linnaean Society, March . . . . .  | <i>The Society.</i>     |
| Proceedings, Royal Society, February . . . . .                                      | <i>The Society.</i>     |
| Monthly Notices, Royal Astronomical Society,<br>March . . . . .                     | <i>The Society.</i>     |
| Quarterly Journal, Meteorological Society,<br>January . . . . .                     | <i>The Society.</i>     |
| The Mathematical Theory of Stream Lines, by<br>Professor Rankine . . . . .          | <i>The Author.</i>      |
| Proceedings, American Philosophical Society,<br>July to December . . . . .          | <i>The Society.</i>     |
| Journal, Franklin Institute, March . . . . .  | <i>The Institute.</i>   |
| Schriften der Koniglichen Physk, Okonom<br>Gesellschaft zu Konigsberg . . . . .     | <i>The Society.</i>     |
| Proceedings, American Association for the<br>Advancement of Science, 1870 . . . . . | <i>The Association.</i> |
| Forty-seventh Annual Report, Liverpool Insti-<br>tute . . . . .                     | <i>The Institute.</i>   |

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APRIL 29th.

|  |                     |
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| Proceedings, Literary and Philosophical Society<br>of Manchester . . . . . | <i>The Society.</i> |
| Journal, Society of Arts, nos. 1007-1018 . . . . .                         | <i>The Society.</i> |
| Proceedings, Society of Antiquaries, vol. 5, no.<br>8 . . . . .            | <i>The Society.</i> |
| Transactions, Botanical Society of Edinburgh,<br>vol. 11, part 1 . . . . . | <i>The Society.</i> |
| Proceedings, Royal Society of Edinburgh, 1870-<br>71 . . . . .             | <i>The Society.</i> |



**Dr.** *The Literary and Philosophical Society, in Account with the Treasurer.* **Cr.**

| 1870-1.                                     |     | £  | s. | d.              |
|---|-----|----|----|-----------------|
| To Cash paid Mr. Marples, for Printing, &c. | 89  | 9  | 3  |                 |
| " Mr. Tinsling, do.                         | 8   | 5  | 6  |                 |
| " Secretary's Expenses                      | 10  | 9  | 9  |                 |
| " Editorial Fee                             | 10  | 10 | 0  |                 |
| " Mrs. Johnson, for Tea, &c.                | 18  | 12 | 2  |                 |
| " Waiters' Attendance                       | 2   | 2  | 6  |                 |
| " Mr. Moore                                 | 0   | 12 | 0  |                 |
| " Postages                                  | 0   | 10 | 9  |                 |
| " Annual Dinner, viz., cost                 | 28  | 17 | 6  |                 |
| Less received ..                            | 7   | 17 | 6  |                 |
|   |     |    |    | 1 0 0           |
|   |     |    |    | <hr/> 141 11 11 |
| Balance in hand, viz. Dock Bonds            | 250 | 0  | 0  |                 |
| In Treasurer's hands                        | 68  | 13 | 7  |                 |
|   |     |    |    | <hr/> 318 13 7  |
|   |     |    |    | <hr/> £460 5 6  |

| By Balance from last Account—             |      | £  | s. | d.             |
|---|------|----|----|----------------|
| In Dock Bonds                             | £250 | 0  | 0  |                |
| In Treasurer's hands                      | 18   | 16 | 8  |                |
|   |      |    |    | <hr/> 268 16   |
| " Annual Subscriptions—                   |      |    |    |                |
| 135 at 21s.                               | 141  | 15 | 0  |                |
| 4 at 10s. 6d.                             | 2    | 2  | 0  |                |
| 13 Entrance Fees                          | 6    | 18 | 6  |                |
| 28 Arrears                                | 29   | 8  | 0  |                |
|   |      |    |    | <hr/> 180 1 6  |
| " Interest on Dock Bonds, less Income Tax | 11   | 7  | 4  |                |
|   |      |    |    | <hr/> £460 5 0 |

**E. & O. E.**  
**Audited and found correct,**  
**(Signed) WILLIAM UNWIN,**  
**EDWARD DAVIES.**

PROCEEDINGS  
OF THE  
LIVERPOOL  
LITERARY AND PHILOSOPHICAL SOCIETY.

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ANNUAL MEETING.—SIXTY-FIRST SESSION.

ROYAL INSTITUTION, October 2nd, 1871.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

The Minutes of the last Meeting of the previous Session were read and signed, after which the following recommendation from the Council was put from the Chair, and carried unanimously.

“That the following sentence shall be appended to Law 51. ‘And during the discussion, no member shall speak for more than ten minutes except by vote of the Meeting.’”

The Honorary Secretary then read the following

REPORT.

The proceedings of the past Session of the Literary and Philosophical Society present features similar to those which have marked the Society's career for many years. The attendance of members has been satisfactory, and the Papers and Miscellaneous Communications have been of an interesting character. The volume containing these contributions is now ready for delivery to the members.

The number of ordinary members is somewhat less than last year, being 198, as against 206; and of those whose names have thus been removed, four are deceased, viz., Mr. Nisbet, who was a life member, and had been connected with the Society for twenty-four years; Mr. Newlands, the late Borough Engineer; Mr. J. R. Jeffery; and the late Hon. Librarian, Mr. Flueck.

The list of corresponding members and associates remains unaltered, but that of the honorary members has been largely increased, by the election of several of the leading scientific men connected with the recent visit of the British Association to Liverpool, and now contains forty-four names. Death has removed from this class one name, which had been on the roll for more than a quarter of a century, that of Mr. James Yates, M. A., F. R. S., F. G. S., F. L. S., a brief memoir of whom is added as an appendix to this Report.

During the past year, the Council, on behalf of the Society, presented a memorial to the Mayor and Corporation, on the dilapidated condition of the Conservatories at the Botanical Gardens, and the consequent loss which would be felt by all local students of natural history, if they were deprived of these very valuable means of study. The Council are glad to state that these Conservatories are now in course of reconstruction.

The members will be glad to learn that their old friend, and for many years Vice-President, Dr. Edwards, has been promoted to the Professorship of Physical Science and Microscopy, in Lennoxville College.

It is a source of very great satisfaction to the Council to be able to report that the valuable donations which the Society receives from time to time, from learned societies at home and abroad, have at length been collected and bound in volumes, and thus made accessible to the members. The Honorary Librarian has spent a good portion of the recess in

arranging the library, which now consists of over nine hundred bound volumes, besides numerous pamphlets; the catalogue is now completed, and will be placed on the table every evening of the Meetings, and the Honorary Librarian will be in attendance at a quarter past six to give out books to members.

The Council conclude their Report with the customary nomination of five new members, to be elected on the Council for the ensuing Session, and submit the following names:— Messrs. R. C. Johnson, H. Heathcote Statham, Jun., Baron Louis Benas, H. S. Samuel, and Geo. S. Wood.

#### APPENDIX TO REPORT, 1871-72.

The name of Yates holds an honourable position in the history of this Society. The Rev. John Yates, the father of the honorary member whose decease is alluded to in this Report, was the friend of Roscoe, Rathbone, Shepherd, and Currie, who stand recorded among the founders of this Society. Joseph Brookes Yates, F.S.A., another son, was also one of the original members, and filled the office of President for several years with singular zeal and ability; while the names of two other sons on the list of members give additional testimony to the interest taken by this family in the Society's proceedings.

The subject of this notice was born in 1789, and died in May last, at the advanced age of eighty-two. He was educated at Glasgow for the ministry, the active duties of which he discharged until middle age. He then devoted himself to science and literature; became, in 1834, one of the Honorary Secretaries of the Committee of Sciences to the British Association for the Advancement of Science; contributed largely to Dr. Smith's Dictionary of Greek and Roman Antiquities,

and associated himself with the Linnæan, Geological, and other learned Societies in the metropolis. When the decimal system of weights, measures, and coinage was first propounded in this country, he became one of its most ardent supporters. The volumes for 1852-53 and 1861-62 of this Society's Proceedings each contain a contribution by Mr. Yates.

From this brief memoir it will be perceived that our late honorary member was a man of large and wide intellectual culture, to which we may add that he was possessed of a remarkable memory. Being a man of wealth, he surrounded himself with works of art and literature, and he extended a splendid hospitality to artists, scholars, and men of science, whom he frequently invited in large numbers to his table.

The Treasurer then submitted the Annual Statement of Accounts, which, together with the Report, was unanimously adopted. The funds in hand being considered very satisfactory, Messrs. Picton and Higginson suggested, and it was thought desirable by the Meeting generally, that the Council should engage some man, the most eminent in his department, to give a special lecture before the Society during the current Session.

The members then proceeded to the election of Officers, and the ordinary Members of Council, when the following gentlemen were appointed: Vice-Presidents—Alfred Higginson, M.R.C.S., Arnold Baruchson, Thomas J. Moore, Cor. Mem. Z.S.; Honorary Treasurer—Albert Julius Mott; Honorary Secretary—James Birchall; Honorary Librarian—Alfred Morgan; Members of Council—Edward Davies, F.C.S., Rev. W. Kennedy-Moore, M.A., Alfred E. Fletcher, F.C.S., Rev. W. Banister, B.A., Ewing Whittle, M.D., J. Campbell Brown, D.Sc., F.C.S.,

Joseph F. Robinson, Rev. W. H. Dallinger, Richard C. Johnson, H. Heathcote Statham, Jun., Baron Louis Benas, H. S. Samuel, George S. Wood.

The names of the Associates were then read over, and all of them were re-elected.

The Honorary Librarian then submitted a MS. Index to the Society's Proceedings, Vols. I. to XXIV., which was received as a contribution and taken as read. The thanks of the Society were accorded to him for his valuable compilation.\*

The President then delivered his Third Inaugural Address, which will be found at length in another part of the volume.†

### FIRST ORDINARY MEETING.

ROYAL INSTITUTION, October 16th, 1871.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

A communication was received from the Council recommending the delivery of a special lecture to the Society, as suggested at the Annual Meeting. The recommendation was adopted.

Mr. M'QUIE exhibited a Map of Old London in 1560, and also an old oil painting representing Lord Street, Liverpool.

Mr. MARPLES exhibited a Newspaper printed at Salonika, in four languages, Greek, Greek in Hebrew characters, Turkish and Spanish.

\* This Index will be found at the end of the Volume.

† See page 1.

A communication was received from Mr. T. J. MOORE, stating that a fine living specimen of Electric Fish (*Malapterurus Beninensis*) had lately been received at the Free Museum, from Capt. J. B. Walker, of Old Calabar. The specimen was subsequently placed in a tank in one of the hothouses at the Botanic Gardens.

Mr. R. C. JOHNSON then read a Paper on "The Approaching Transits of Venus in 1874 and 1882,\* which was followed by the usual discussion.

Previous to the business of the First Ordinary Meeting an *Extraordinary Meeting* was held, when the addition to Law 51, proposed at the Annual Meeting, was approved of and confirmed.

## SECOND ORDINARY MEETING.

ROYAL INSTITUTION, October 30th, 1871.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Dr. J. CAMPBELL BROWN described certain peculiarities in the organs of the Electric Fish (*Malapterurus Beninensis*) lately presented to the Free Museum, and in the course of his remarks pointed out the fact that there was no Electrometer to be found in Liverpool for measuring the electric force of animals.

Mr. BENAS exhibited some specimens of pesetas, or fragments of dollar, used as coins in South America and the West Indies.

Mr. G. S. WOOD then read a Paper on "The Past and Present of Optical Appliances."†

\* See page 255.

† See page 49.

*An Extraordinary Meeting* was held previous to the above, to consider the proposed appropriation of the Society's funds for the purposes of a Special Lecture. The following resolutions, having been passed by the Council, were now submitted to the Meeting, and unanimously approved of.

1.—That the Lecture sanctioned by the Society be called "The Roscoe Lecture" of the Liverpool Literary and Philosophical Society, to be delivered annually, by gentlemen of eminence in the literary and scientific world, selected for the purpose by the Council.

2.—That a sum not exceeding twenty-five guineas and expenses be paid for each such Lecture.

3.—That the Lectures be delivered in some public room, admission to the members free, with one additional ticket. Admission for the public to be fixed by the Council.

### THIRD ORDINARY MEETING.

ROYAL INSTITUTION, November 18th, 1871.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Mr. Peter Procter was balloted for, and unanimously elected an ordinary member.

Mr. B. L. BENAS exhibited an original Iron Cross, given by Frederick William III. of Prussia to the veterans of the War in 1813 and 1814.

Mr. PICTON exhibited a copy of the first edition of Bradshaw's Railway Guide, published in 1840.

Mr. A. HIGGINSON called attention to a new or extended locality for the glacial striation of the surface of the New Red Sandstone, near Liverpool, in a brickfield to the south of North Hill Street, near Admiral Street.



Mr. THOMAS J. MOORE exhibited the following recent additions to the Free Museum:—Specimens of Baleen, of various ages, of *Balenoptera Sibbaldi* and *B. rostrata*, presented by Dr. Millen Coughtrey. Male and female specimens of *Lemur macaco*, from Madagascar. In this species the colour of the sexes differs, the male being black and the female brown, a fact only recently discovered. The carapace of the Ipi, or largest known species of *Manis* (*Pholidotus giganteus*), from West Africa, presented by Capt. Hannah. Mr. Moore stated that during the past summer living examples of the following species of Brazilian freshwater fish had been presented by Capt. J. A. Perry, Associate of the Society, and had been placed in the Museum Aquaria, viz., five specimens of *Camboata* (*Callichthys asper*), two specimens of *Traira* (*Macrodon trahira*), and seven specimens of *Cara* (*Heros* — ?); all from Rio Janeiro.

Dr. WHITTLE then read a Paper on “The Census and its results, as affecting population theories.” \*

Previous to this Meeting an *Extraordinary Meeting* was held, when the vote of funds for a Special Lecture was passed a second time, and finally confirmed.

#### FOURTH ORDINARY MEETING.

ROYAL INSTITUTION, November 27th, 1871.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Mr. T. J. MOORE exhibited a specimen of a rare Lemur (*Propithecus Damanus*), from North-east Madagascar, lately added to the Free Museum; a skull and casts of bones of the Great Auk (*Alca impennis*), now supposed to be extinct; and a case of butterflies from Old Calabar, collected and presented by Captain J. B. Walker.

\* See page 27.

The PRESIDENT read a passage on "A case of Orchis structure by natural selection," from a recent work by Mr. A. R. Wallace, in which the writer predicts the existence in Madagascar of a moth with a proboscis sufficiently long to reach the nectar in the largest flowers of the Orchid (*Angræcum sesquipedale*), the nectaries of which are from ten to fourteen inches in depth.

The Rev. H. H. HIGGINS exhibited a number of remarkable fossil ferns, which he had obtained from the Coal-Measures at a railway excavation near St. Helens, and had placed in the Museum. Mr. F. P. Marrat stated that the collection contained several species new to the British list. Mr. Picton and others spoke in terms of high praise of the exertions in the cause of science made by the Rev. H. H. Higgins.

Dr. HAYWARD exhibited an Anemometer which he had recently adapted for testing the ventilation in the air-flues which had been constructed in his own house.

Mr. G. S. WOOD related a remarkable instance of the recovery of vision which had lately come under his observation, through the operation of severing the iris to relieve the pressure of the eyeball upon the retina.

Various other topics of a miscellaneous character were discussed during the remainder of the evening.

Previous to the business of the above Meeting, the members present formed themselves into an *Extraordinary Meeting*, to consider a recommendation from the Council to grant £10 to the fund now being raised, under the patronage of the British Association, to enable the Rev. Dr. Tristram and the Rev. Dr. Ginsburg to make further explorations in Moab. The recommendation was agreed to for the first time.

## FIFTH ORDINARY MEETING.

ROYAL INSTITUTION, December 11th, 1871.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Ladies had been invited to attend the Meeting, and there were many present.

Mr. Richard Leigh, M.R.C.S.E. was elected an ordinary member.

The Rev. H. H. HIGGINS described certain unusual appearances of the planet Mercury during the previous week.

Mr. WALTHER explained some defects in the syphons of drain pipes, and proposed as a remedy the insertion of a pipe in the upper bend of the syphon, and the continuation of this pipe either into the kitchen chimney or above the housetop, for the more effectual ventilation of drains. Mr. A. E. Fletcher, said he had adopted the plan, and found it to answer its purpose. Dr. Hayward, who described the system of ventilation in his own house, also recommended the plan.

Mr. H. H. STATHAM, Jun. then read a Paper "On the theory and principles of Architecture, and its relation to modern life.\*

An *Extraordinary Meeting* was held before the business of the Fifth Meeting began, when the grant of £10 for the Moabite Exploration Fund was considered a second time and passed.

\* See page 227.

# SIXTH ORDINARY MEETING.

ROYAL INSTITUTION, January 8th, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

Messrs. Charles Courtenay Deane and Wellington A. Williams were elected ordinary members.

Mr. A. HIGGINSON exhibited some roses which, under the influence of manuring with sewage, had become deformed by the growth of a separate flower, with calyx and petals, from the centre of the original flower.

Mr. MORTON exhibited a piece of tertiary limestone, from Egypt, with a group of nummulites.

Mr. H. H. STATHAM, jun., exhibited fac-similes of a supposed fresco portrait of Dante at thirty-five (?), painted by Giotto, in the cathedral of Florence.

Mr. B. L. BENAS then read a Paper "On some phases in the History of various Military Nations."\*

# SEVENTH ORDINARY MEETING.

ROYAL INSTITUTION, January 22nd, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

Ladies were present at this Meeting.

Mr. E. Russell was elected an ordinary member.

The Rev. H. H. HIGGINS made some observations upon the letter concerning Deep Sea Dredgings, by Professor Louis

\* See page 161.

Agassiz, which had been printed and privately circulated, and a copy of which he now presented to the Society.

After some further remarks by Mr. BENAS, touching the scarcity of silver,

Mr. PICTON read a Paper on "Landmarks in English Constitutional History." \*

#### EIGHTH ORDINARY MEETING.

ROYAL INSTITUTION, February 5th, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

Ladies were present at this Meeting.

Messrs. JOHN H. W. Biggs and Ralph B. Cudlipp were elected ordinary members.

Mr. JOHN NEWTON, M. R. C. S., then read a Paper on "The History of the Arts of Writing and Printing," and a large number of old works in MS. and print were exhibited in illustration of the Paper.

#### NINTH ORDINARY MEETING.

ROYAL INSTITUTION, February 19th, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

The Rev. H. H. HIGGINS referred to the library which was in course of formation for the purpose of being presented to the citizens of Chicago, and moved a resolution, "That a set of the Society's Proceedings, suitably bound, should be presented to this Library." The resolution was seconded by Mr. UNWIN, and carried unanimously.

\* See page 67.

Mr. R. JOHNSON next gave a brief report of the last tidings of the Moabite Exploration party.

Mr. MOTT referred to Dr. Beke's letter in the *Athenæum* of the previous week, relative to the alleged discovery in S.E. Africa, opposite the island of Madagascar, of some remains of ancient cities.

Mr. A. J. MOTT then read a Paper on "The Doctrine of Evolution,"\* which was followed by a discussion, in which Messrs. Morton, Higgins, Kennedy, Moore, Browne, Birch, Dallinger, Newton, and Davies took part.

#### TENTH ORDINARY MEETING.

ROYAL INSTITUTION, March 4th, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

Mr. MOTT pointed out, on a large map of the new lake district of Africa, the position of Sir S. Baker's expedition when last heard of, and the proposed route of the party going out in search of Dr. Livingstone.

Messrs. Matthew W. Armour, Carter, Bickerton, and Ward were elected ordinary members.

The Rev. A. GORDON then read a Paper on "The Fortunes of a Flemish Mystic,"† in which he recounted the life and work of Mademoiselle Bourignon.

\* See p. 187.

† See p. 103.

## ELEVENTH ORDINARY MEETING.

ROYAL INSTITUTION, March 18th, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

A communication was received from the Council, stating that a set of the Society's Proceedings were to be presented to the collection now being formed in England for presentation to the city of Strasbourg.

Messrs. G. E. Walker, A. Pringle, and F. W. Jackson were elected ordinary members.

Dr. HAYWARD exhibited some dead specimens of rattlesnakes, with separate specimens of the poison-fangs, poison-liquid, &c. The exhibition of the specimens gave rise to a long discussion on the various antidotes which had been used most efficaciously to counteract the bites of these reptiles, Messrs. Higgins, Higginson, Rickard, and Carter being the chief speakers.

Mr. R. JOHNSON gave an interesting account of the progress of the Moab Exploration Party, and read various extracts from a letter from his son, who is one of the explorers.

Mr. MOORE exhibited a stuffed specimen of *Calamoichthys Calabaricus* (a rare ganoid fish, remarkable for the absence of the ventral fins), recently presented to the Free Museum by Capt. J. B. Walker, Old Calabar.

The Honorary Secretary then read a Paper on "The Works of Philip Massinger, the Dramatist."

# TWELFTH ORDINARY MEETING.

ROYAL INSTITUTION, April 1st, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

Dr. HAYWARD exhibited the rattles of the rattlesnake ; also the poison-gland, dissected so as to show the mechanism ; and also the reserve-fangs and the functionary-fangs.

Mr. BENAS exhibited a Mormon newspaper, and read some extracts therefrom illustrative of literature and life in the Great Salt Lake City.

Mr. PICTON introduced to the Meeting the following poem, which he read, and which had been composed and published in honour of the foundation of the Society in 1812, by an anonymous author.

## ON THE INSTITUTION OF THE LITERARY AND PHILOSOPHICAL SOCIETY OF LIVERPOOL, 1812.

While war extends his horrid roar  
From realm to realm, from shore to shore,  
Old Mersey yet, with wave serene,  
Rolls murmuring through a peaceful scene ;  
Th' approaching bark's expanded wings  
No desolating fury brings,  
But with delight the wanderer sees  
Its white sail swelling in the breeze ;  
And still, amidst the peopled plain,  
Do Science and the Muse remain.

A thoughtful band, to win their smile,  
Quit their accustomed cares awhile ;  
Profession leaves his technic lore,  
And Commerce rests upon his oar.

May Science, as in days of old,  
To them her mysteries unfold ;  
As when th' admiring world of yore  
Saw our immortal Newton soar ;



Or as when Franklin, honoured sage,  
 Instructed and improved the age ;  
 Or as when Locke himself defined  
 The Logic of the human mind ;  
 O ! breathe, ye names for ever dear,  
 A portion of your spirit here.

Nor less the Muse her influence lend ;  
 Soft may her varied notes ascend ;  
 Such as when Milton sung sublime  
 'The wonders of commencing time ;  
 Or such as when, to nature true,  
 The changeful seasons Thomson drew ;  
 Or such as Cowper's sacred lays,  
 That win to virtue's holy ways.

Long may attention's raptured ear  
 Our Roscoe's tuneful numbers hear ;  
 The beauties of his native stream,  
 At once his pleasure and his theme ;  
 And long on Mersey's peaceful side  
 May Science and the Muse abide.

The Rev. W. H. DALLINGER then read a Paper on the following question, " Should Naturalists recognise a Fourth Kingdom in Nature ? " \*

### THIRTEENTH ORDINARY MEETING.

ROYAL INSTITUTION, April 15th, 1872.

J. BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Ladies were invited to this Meeting.

A communication was received from the Council recommending the election of Capt. Alfred Horsfall, S. S. *Canopus*, and Capt. J. B. Walker, *Hulk Winifred*, Old Calabar, as

\* See page 279.

Associates of the Society. Both of these gentlemen have frequently sent Natural History specimens to the Free Museum, and information relating thereto, which has been communicated to the Society.

Mr. STEARN exhibited a galvanometer, applied to the detection of counterfeit gold coins, which excited considerable interest.

Mr. T. J. MOORE made several valuable communications. He exhibited some very fine specimens of a rare species of Ruminant from Tartary, known as the Saiga Antelope (*Saiga Tartarica* of Pallas), remarkable for the pale colour of the horns, for the prolongation and development of the muzzle, exceeding that of any other known recent ruminant, and showing by the scooping out of the nasal bones a marked resemblance to the skull of the huge extinct *Sivatherium*, from the Miocene beds of the Sivalik hills of the Sub-Himalayas. The specimens of Saiga consisted of an adult male and female in summer coat, and a young male in winter dress, which have lately been mounted for the Museum. The head and horns of the Pronghorn Antelope of the Western States of America, and a cast of the *Sivatherium* skull, were also exhibited; and the points of resemblance among the whole of these, as elucidated in the recent writings of Dr. J. Murie,\* were pointed out.

Mr. MOORE announced the death of Capt. WHITEWAY, Associate of the Society, which took place at Valparaiso on the 15th of February last. He gave the following brief account of Capt. Whiteway's labours in the cause of Natural History.

For many years Capt. Whiteway assiduously used the towing-net in his voyages between Liverpool and Valparaiso, and displayed wonderful skill and careful manipulation in collecting and preserving the more minute and delicate

\* *Vide Geological Magazine* for October, 1871.

organisms found among the floating population of the sea. In the *Annals and Magazine of Natural History* for September, 1868, appeared an enumeration, by Mr. F. P. Marrat, of twenty-four species of *Carolina* and other *Pteropoda*, and fifteen species of *Ianthina* and other *Heteropoda* thus collected. This list represented only a section of his captures, which included many of the smaller cephalopods and other mollusca, as well as crustacea, fish, &c., specimens of which were liberally presented by him to the Free Public Museum, and had been exhibited at various meetings of the Society.

Mr. WILLIAM UNWIN then read a Paper on "Madeira as a Sanatorium." \*

#### FOURTEENTH ORDINARY MEETING.

ROYAL INSTITUTION, April 29th, 1872.

J. BIRKBECK NEVINS, M. D., PRESIDENT, in the Chair.

Ladies were invited to be present, and there was a large attendance of members and friends.

Previous to the usual business of the Meeting, the members assembled in the small library for the purpose of electing the President for the ensuing term of three sessions. The name of Mr. A. J. Mott, Honorary Treasurer, was proposed by the Rev. H. H. Higgins, and seconded by Mr. J. A. Picton, both of whom spoke in terms of high eulogium upon the services rendered to the Society by Mr. Mott. No other candidate being proposed, the vote was taken by a show of hands, and there being no dissentients, Mr. Mott was declared duly elected. The President elect was then brought into the room by his proposer and seconder, amidst the

\* See page 271.

acclamations of the members, and, being informed from the chair of his election, briefly acknowledged the compliment. The Meeting was then adjourned to the Lecture Theatre.

Mr. Joseph Hiles was elected an ordinary member.

The President next read the following letter from Dr. Tristram :—

“On the 14th of February, we descended the stupendous gorge of the Arnon, on the south side, the broken remains of the old Roman road being everywhere visible, and with no little difficulty reached the northern side after nightfall. Camping close to Aroer, the ruins of which contain no interesting features, though they overhang the magnificent gorge, we determined upon our future course, namely, to explore, in the first instance, the whole of the eastern highland plateau—the ancient “*Mishor*” of Moab—as far north as the Wady Nā’ūr ; then to examine the bold crest line which overhangs the Dead Sea, crowded with ancient ruins, the true cradle of Moab ; and lastly to examine the eastern shores of the Dead Sea, and the hot seething plains of Shittim, now known as the Seisāban. Having examined the ruins of Bezer and Dhiban,—the latter now so celebrated as the place where the Moabite Stone was discovered, but the ruins of which, though extensive and elaborate, contain no feature of interest,—we struck due east, about fifteen miles, to Um Rāsās, to which Messrs. Palmer and Drake had already paid a hasty visit. Finding abundance of water, we made it our head quarters for some little time, to work the neighbouring country. The ruins of Um Rāsās in themselves, though very interesting, are generally late, that is, of the Byzantine-Greek period, containing five Christian churches, and three or four much older Greek temples. A very beautiful mortuary tower, nearly perfect, forms a landmark for miles round ; but we found that, in spite of the maps, we were still fifteen miles west of the Hadj road. Between our camp and the road were

several smaller places in ruins, and immediately beyond the road itself we found a fine old Saracenic khan, to the east of which were old Doric remains of square temples, and other indications of an earlier city. We found the whole country a rich upland plain, covered with herbage, and studded with ruined cities (often scarped with the little wadys which, twenty miles to the westward, become the tremendous gorges that open upon the Dead Sea), few of the local names of which have enabled me as yet to find their ancient appellations. Many of these names are down in the maps, but rarely, if ever, in their proper places. Our most interesting discovery in this region, not, indeed, for its antiquity, but for its beauty, was that of a sumptuous palace, the elaborate fretworks of which will not yield even to the Alhambra. My friends, Mr. Johnson and Mr. Buxton, have taken care to illustrate this well by their photographs. We next took a south-westerly direction, until we were on the crest of the range overhanging the Dead Sea, and worked northward as far as Elealah, examining with care each object of interest, or of biblical or other historical note. In this way, all were carefully photographed, and the positions of many rectified. We examined Kiriathaim, Ataroth, Machærus (hitherto believed to be a virgin ruin, in spite of its interest as the place of John the Baptist's martyrdom, and the site of which is wrongly assigned in our maps), Maon, Medeba (of which the ruins are far more extensive and interesting than has been supposed), Nebo, Heshbon, and many other places of minor interest. On the shore between the Arnon and Callirrhœ, we discovered and photographed the ruins of Zara, the Reubenite city, Zarath-shaphan of the Bible. Remounting, by different passes, into the upper crests, we finally descended by the Wady Heshbân, and explored the south-east end of the plains of Jordan, with the ruins of Beth Jesimoth and others, and then examined the shores of the Dead Sea, to

within a mile of the mouth of Callirrhoë, where we had already been. I trust that when our results shall be worked out, both archæological, topographical, and physical, they may not disappoint those who kindly sped our parting steps.

“GREATHAM VICARAGE,

“22nd April, 1872.”

Mr. R. C. JOHNSON gave some additional information concerning the route taken by the Moab Exploration Party, which he traced on a large map of the district surveyed.

Mr. T. J. MOORE brought before the Society a fine series of specimens and skulls of the Harp Seal (*Pagophilus Grælandicus*), illustrating the differences due to sex and age in this very variable species, and also two specimens of the Hooded Seal (*Cystophora cristata*), forming part of a very handsome donation made to the Free Museum by Mr. Charles Bowering, per Mr. C. T. Bowering. They were specially obtained for the Museum in the spring of 1871, by one of Mr. Bowering's ships engaged in the Newfoundland Seal fishery, and sent home shortly after, with two other Seals, the species of which have yet to be obtained, but which are called by the Newfoundland Sealers the “Harbour Ranger” and the “Square Flipper.”

Mr. MOORE also exhibited and remarked upon a fine mounted skeleton and specimen of the Enchada or Hoe Fish (*Ephippus gigas*). The skeleton is remarkable for the large size and density of many of the bones, especially of the upper part of the skull, of the ribs, and of some of the interneural spines, above all by the size and density of the first interhæmal spine.

For these specimens the Museum was indebted to Capt. J. A. Perry, Associate of the Society, by whom they had been specially obtained after much careful enquiry among fishermen and others, in order to determine what species of

Brazilian Fish produced a very remarkable hammer-like bone previously in the Museum collection, which proved to correspond exactly to the first interhæmal spine above mentioned.

Capt. PERRY, who was present, related the circumstances by which he found the bone to belong to the Enchada, and was complimented by the President on his success in settling this question.

A letter was read from Mr. DUCKWORTH, urging the establishment of restrictions upon the seal fishery, which elicited considerable discussion.

The Rev. H. H. HIGGINS then read a Paper on "The Microscopic Characters of the Cotton of Commerce," illustrated by photographs prepared by Mr. T. HIGGIN, of Huyton, and exhibited by the Oxy-hydrogen Light.\*

\* See page 301.

# INAUGURAL ADDRESS.

By J. BIRKBECK NEVINS, M. D. LOND., PRESIDENT.

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M A N :

*Part 1st—HIS ORIGIN.    Part 2nd—HIS FUTURE.*

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## PRELIMINARY.

THE great scientific gathering of the year has again taken place since we last met, and I will endeavour to bring before you some considerations connected with the topics which were there discussed, and the reception they met with.

With respect to the meeting itself, it was a noticeable circumstance, how few of the great leaders of scientific thought took an active, or indeed any, part in the proceedings; for though Huxley, as the retiring President, was of course there, he took little part in the discussions during the meeting. Owen was there, and I believe did not speak at all. Darwin, Grove, Hooker, Tyndall, and Wallace were not at the meeting. Stokes read a paper for a friend, who was absent. The most eminent mathematicians of the day were either absent or silent. No geographer of popular eminence was at the meeting; and there were no new chemical or scientific experiments shown, which impressed themselves upon the popular mind. Those visitors, therefore, who went to Edinburgh with the hope of seeing or hearing the great movers of thought in the scientific world, would be, to some extent, disappointed, from their absence or their silence.



The Sections which attracted the largest audiences were those in which Life, and its phenomena or interests, were discussed; and in the Anthropological Section it was sometimes difficult to obtain even standing room, whilst the interest of the audience was manifested in a manner not usual in scientific meetings; for the various sentiments expressed were received with cheers or hisses, as they happened to be approved or disapproved by the hearers; and at times the uproar was so great, that the President of the Section in vain attempted to keep order. This was chiefly the case when the origin or position of man was in some way or other the subject of discussion; and it appeared as if some of the hearers were so strongly impressed with their own views upon the subject, that the lower the origin, and the more debased the character assigned to humanity, the more enthusiastic were the cheers; whilst, as was natural, these were met by dissentient cries, which could find no adequate expression except in downright, unequivocal hissing.

The origin of Life itself, as distinguished from the origin of Man, excited, on the contrary, little interest. The speakers were few, and without enthusiasm in their subject. The audience was listless, and seemed wearied with the topic. The leaders in Biological studies held aloof from the discussions, with the exception of Bastian on the one side, and Grace Calvert on the other; and the general opinion appeared to be that the matter had been sufficiently discussed for the present, that there was nothing convincingly new on either side, and that it may now be allowed to rest for a season.

#### PART I.—THE ORIGIN OF MAN.

There are probably few persons who have not entered, more or less, into the question of the origin of Man, which has been so prominently brought forward of late; and there are many who look upon it with a feeling of doubt, distrust,

or of positive repugnance ; so opposed to all our earlier beliefs are the statements put forward by high authorities, and so difficult is it for those who believe in the high parentage and destinies of man, to concur in the conclusions of those who would carry back his descent through the apes and still lower forms of mammalian life, down to the lowest forms of fishes, and through them to a creature of aquatic origin, which is amongst the lowest in the scale of animated beings.

I will now endeavour very briefly to indicate the facts, and the arguments based upon them by the advocates of man's low origin ; and point out some considerations which, I think, are overlooked by those who regard the matter solely from a naturalist's point of view, but which ought to be duly weighed by naturalists, as well as by others, unless they would be content with an imperfect and one-sided view of this important subject.

The *general structure* of the human frame is so similar to that of the mammalia generally, as to indicate a close degree of relationship ; for it is felt that if two living beings closely resemble each other (especially in features that may be considered of no special importance to either of them), the resemblance is probably due to both having descended from some common ancestor. And such resemblances are found in the case under consideration ; for man possesses seven bones in his neck (a singular number, for which there is no obvious reason), and so also do all the apes, and the carnivorous races generally. The cameleopard has but seven in its long neck, and the elephant and the mole have the same number in their short necks. Every ruminant animal has also seven ; and so have also the whale and the porpoise, whose resemblance to man in external character is almost inappreciable.

If the *hand and arm* of man are compared with the fore-leg and foot of quadrupeds, of whatever class they may be, the similarity in the number of the bones, and their arrangement, is so great as to leave no doubt of the substantial correspondence; and in the flapper of the whale or the porpoise, the correspondence, even to the bones of the fingers, is still strikingly manifest. Now, as no apparent object is attained by this similarity of bony structure in animals so widely different, it is more reasonable to attribute the resemblance to their having sprung from some common origin, than to suppose that an Intelligence, capable of such a manifestation of power, would have created so many different beings independently one of another, and yet all agreeing in characters which answer no beneficial purpose in their economy. It is evident that, if this line of argument applies to animals lower than man, it will equally apply to him, so far as he is a member of the world of animal life.

And if, turning from these varied beings in their native and perfect condition, we examine them in their most *rudimentary state*, we find that the resemblance in their earliest embryonic condition is so great, that it is for some time impossible to distinguish them; and that the highest pass through various temporary stages of development, which closely correspond with the permanent conditions of lower forms—man himself being at first without a trace of limbs however rudimentary, and having his spine terminating in a free tail, which is for some time longer than his legs, even after these organs eventually make their appearance. The human foetus is also covered with a fine down at a certain stage of its development; and it is not uncommon to find that children at their birth have downy hair on parts of the body, from which it disappears during the early period of infancy; from which it is inferred that man is derived from some ancestor having a tail, and covered with hair.

*Objection.*—"The various classes of animals are constituted upon an intelligently modified plan."—And *Answer*.

If it should be said, in answer to this conclusion, that the Intelligent Author of Creation has proceeded upon a definite plan, and modelled the different classes of animals upon the same general type, varied according to the beneficial requirements of each, a number of facts are brought forward of a different character from the above, and all in the direction of *irregularity*, and *departure* from the *ordinary plan* which is assumed as that which has been intelligently adopted by the author of nature. These facts come under the general head of monstrosities, or accidental and irregular parts; and the inference from them is still in the direction of showing a common parentage for the very varied forms of animals now existing.

*Muscles.*—It happens so frequently as to have been commonly observed, by writers on human anatomy, that various muscles are sometimes found in the limbs and other parts of the body, which are not generally present. They are an exception; and it may be a comparatively rare exception; but still, their occurrence is so frequent, that it cannot be regarded as accidental. And on pursuing the investigation more widely, it is found that these irregular, and only occasional muscles in man, are ordinary and constant in apes or other animals; and the inference is drawn that they are occasionally present in both, because both are descended from some common ancestor, which possessed them as a natural part of its frame. It is abundantly proved that such great differences may be artificially produced in animal and vegetable forms, that the original parentage shall be almost lost in appearance; but that the original features occasionally re-appear, and prove the descent of the altered form. Just as it is often seen that a child shall have little resemblance to its parent, but a grandchild, or even still more

remote descendant, shall exhibit some characteristic feature, which unquestionably indicates its remote parentage.

In the *bony system* of man, it happens occasionally that various unusual circumstances are noticed ; such as bones in separate portions, which are generally united into one mass ; or bones pierced by holes, or otherwise marked, where these holes or markings are not naturally present ; and these unusual conditions of the bony system are found to be the ordinary natural condition of some of the lower animals.

If we turn still further to the *internal organs* of man, it is found that they occasionally exhibit departures from the ordinary human form, which are, however, merely the natural condition of animals lower in the scale of creation. Such are the occasional occurrence of a double uterus as a monstrosity in the human system, though it is the normal condition of this organ in many quadrupeds.

The *canine teeth* in man are generally small, and perfectly useless as organs of offence or defence ; and they are generally contained within the mouth, and form an even, unbroken row with the incisors and molars. But cases now and then occur in which they are so large as almost to resemble the tusks which these teeth really form in many animals ; and a gap, or space, exists in the opposite jaw to receive them when the mouth is shut, just as is naturally the case in the gorilla and other animals, whose relationship to man is thus pointed out.

These variations are so numerous, and so important in the inferences to be drawn from them, that naturalists are no longer able to overlook them, or to consider them as accidental ; but they regard them as proving a common descent, however the differences now existing in the animal world may have been brought about.

And when, leaving the merely corporeal part of the living

animal, naturalists turn to the *mental characteristics* observed in various classes of living beings, they find so-called natural instincts of affection for their mates and offspring present throughout the various classes of animals, and often even more strongly developed than in man. For whilst wife-beating, and even killing, is but too common amongst so-called civilised nations, and infanticide is a custom which has prevailed in almost every known period of human history, such treatment of their mates is unknown in merely brute life, and Darwin speaks of infanticide almost as if it were a prerogative of humanity, being, according to him, confined to the human race. Social affection is so common amongst animals as to require no proof; combination for mutual defence or for attack upon enemies; faithfulness and affection to their masters or companions, even though not of their own kind; curiosity as manifested in monkeys; caution and wisdom, gained from experience, as in animals subjected to the attempts of hunters; and so many proofs of reason, that it is no longer attempted to deny the possession of this faculty, in some degree, by many if not most animals. Shame, or vexation, on failure in accomplishing what has been attempted, or in having committed a fault, as is continually seen in trained horses and dogs; emulation and pride; vanity in some, and trusting confidence in others, are some of the mental characteristics in which man and the lower animals resemble each other, and are thought to indicate that the difference between them is in degree, not in kind, and that the difference is not always in favour of the human race.

Considerations such as these have convinced many, I think we may say most naturalists of the present day, that, in some way or other, there is a common parentage for, at any rate, the mammalian division of nature, including man within its limits.

The AGENCIES which are supposed to be capable of producing the development of man from some previous low form of animal life, are three, viz.—

NATURAL SELECTION, SEXUAL SELECTION, EVOLUTION.

*Natural Selection.*—By the first of these terms is simply to be understood “the survival of that living being which is best adapted to the circumstances in which it is placed;” and when we examine the manner in which it is supposed to operate, we find that very great changes are capable of being produced in living forms, provided—and this is an indispensable provision—provided that the change is beneficial to the individual, by increasing its chance of life, and its escape from the various circumstances that cause the death of at least five out of every six living beings, produced on the earth. If, then, a change occurs in a living being which is simply useless in maintaining its life, and still more if the change is positively injurious, such a change cannot have been brought about by Natural Selection. We shall have to refer hereafter to such useless or injurious changes in the case of man, when we try to apply this principle to account for his development.

The principle of Natural Selection operates as follows, when taken in concert with three laws of living beings, about which there is no dispute whatever, viz.—1st. That there is so much diversity amongst all things living, that no two are precisely alike, however closely they may resemble each other in general. 2nd. That the characteristics of a parent are generally more or less transmitted to the offspring. 3rd. That out of every half-dozen living beings produced, only about one survives, the remainder falling a prey to other living beings, or dying from want of vigour or of sustenance, or from some other cause of destruction.

Let us now see how these laws, aided by the so-called

“Natural Selection,” produce the results attributed to them. Let us suppose a litter of six young animals. One of these will have a slightly more hardy constitution than the others; and, under ordinary circumstances, this will be the one of the half-dozen that will survive. But another may have slightly longer legs than the rest; and therefore, if prey is scarce and fleet of foot, these long legs will give an advantage over original strength of constitution, and the long-legged animal will be the survivor rather than the hardy one. Another may be stronger in the jaws, and have rather longer teeth; and if prey is vigorous, instead of fleet, the strength of teeth and of jaw will give an advantage over original hardiness of constitution or length of limb, and this will be the survivor, rather than the other. Another may be a little more hairy than its fellows; and if the season is cold and severe, this extra clothing may more than compensate for the before-mentioned advantages, and the hairy one will be the survivor. And, lastly, one may be the smallest and most puny of the lot; but if the mother’s food or strength should fail, the hardy vigorous offspring may make such demands upon her that she deserts or kills them, as sometimes happens; or they may perish because they cannot obtain sufficient support; while the puny one, which makes but little demand and is easily satisfied, may obtain sufficient for its needs, and thus become the survivor, from its very insignificance and apparent want of advantages.

But since parental characteristics are more or less transmitted to offspring, the hardy animal would have a generally hardy brood, and the hardiest of these would survive under ordinary circumstances, and so a race would be produced, gradually increasing in constitutional vigour. Again, the long-legged animal would have a generally long-legged brood; and under the circumstances supposed of swift prey, the longest legged of these would survive, and thus a long-



legged race would eventually be formed. And so of the hairy and the puny offspring. Under the varying circumstances supposed, several differing races would spring from the same original parent, and might at length become so diverse that it would be difficult to trace the relationship between them.

It is evident, however, from the above description, that natural selection can produce no change but such as is beneficial to its possessor, and assists him to survive in spite of the difficulties which carry off five out of six or even more of its fellows; and therefore, whilst natural selection might produce characters, such as a dull colour, that would aid concealment in animals habitually preyed upon, (because this would increase their chance of escape,) it could not produce bright or striking colours, that would lead to instant detection, because these would lessen the chance of escape, and tend to ensure more rapid destruction. Yet such characters are found abundantly in nature as do not in any known way contribute to the safety of their possessor, but are rather a source of danger; and therefore some other principle must be found to account for this phenomenon in nature.

*Sexual Selection.*—The necessity for an explanation of a great variety of characters, which do not assist towards the survivor of the possessor, such as the plumage of the humming birds or the beard of man, brings us to the Second Principle which is assigned as producing the vast variety amongst the beings assumed to have descended from the same original parents, but having so little resemblance to their ancestors, or to one another, that it is difficult even to conceive the steps through which the conversion has been effected. This principle is styled "Sexual Selection," and may be briefly described as including every character that can assist in gaining or in keeping a mate, whether male or female. As an illustration, may be taken the plumage of

birds. Of two birds, it may be assumed that one has a little more mottling in its tail feathers than the other, and has also the power of erecting the feathers to exhibit their colours. They both exhibit their charms before the female, who is pleased with the bright colours, and selects their owner as her mate. The offspring have a general resemblance to their father; but one is rather more gaily coloured, whilst another is less so than its parent, and again the gay feathers carry the day; and eventually the peacock, with its splendid tail, is the result, whilst the peahen retains its modest, sober colours, because she has no occasion to make much of her charms in order to obtain a mate.

But, to take another illustration; many males are not content with simply exhibiting their charms, and leaving the females to choose, but they fight, in many cases to the death, for her possession; and therefore the strongest will have the advantage, and such characters as are specially advantageous for gaining or retaining her will be gradually developed. And thus, for example, the antlers of the male deer are supposed to have arisen; because they are attractive in the eyes of the female, and give an advantage in fighting with rivals, although they are in many cases a source of danger rather than of safety, and therefore could not have been produced by the agency of natural selection, but are due to the operation of the so-called sexual selection. If, therefore, a character is present which is rather a bar than an attraction, it cannot be produced by "sexual selection;" and if it is rather injurious than beneficial for the survival of its possessor it cannot have resulted from "natural selection."

When, however, these two principles are applied and extended to their utmost limit, it is found that they are inadequate to account for the diversity of life existing in the world, and therefore a further principle must be invoked; for, whilst natural selection might produce all the varied forms of the

ruminant order, it is inconceivable how it could change them into the feline tribe, or the quadrumana; and whilst sexual selection might deck the world of birds with their splendid plumage, it is inconceivable how it could convert the comb of the cock into the antlers of the stag. A further principle therefore, is invoked, to which is attributed greater influence than either, or both of the others, and this is termed "Evolution."

*Evolution.*—The definition of this term, as given by its great expositor and advocate, Herbert Spencer, is as follows :

"Evolution is an integration of matter, and concomitant dissipation of motion, during which the matter passes from an indefinite, incoherent homogeneity, to a definite, coherent heterogeneity, and during which the retained motion undergoes a parallel transformation." *First Prin.*, 2nd ed. p. 396. This definition will scarcely, however, make it evident how the great results attributed to it (such as the evolution of man from the lowest ascidian) are brought about, without some further explanation, which I will endeavour to give as briefly as possible.

All matter is at first homogeneous, and possesses the property (though how obtained is not explained) of "Evolution," which may be briefly described as the power of gradually cohering together more closely than at first, and, during this stage of aggregation and contraction, of producing various off-shoots, or departures from a regular mathematical figure. As the aggregation progresses, so also does the development of more and more complicated forms from the aggregated mass, until at length the complication of the result is almost inconceivable; and this principle applies to all nature, animate and inanimate, mental and corporeal.

Let us now try to illustrate these processes, so as to render them a little more intelligible.

The universe is assumed to have been occupied by a diffused homogeneous substance, or the nebulous matter of the nebular hypothesis. This gradually contracts or aggregates, and the molecular motion which originally kept the particles asunder is dissipated, until at length a more coherent substance is the result, viz., the sun and planets, &c., well-defined, aggregated masses, derived from the nebulous matter, which was less aggregated and undefined. Now this aggregation may produce a sudden change of condition, as when a salt in solution passes at once from the fluid to the solid condition, producing a crystal, or other solid body. In this case the aggregated body is not affected by disturbing or secondary forces, and its form remains permanent, and a crystal retains its character unchanged.

But if the process of solidification is gradual, the mass at some time or other will be so plastic as to admit of change of form, and yet so firm as to retain more or less permanently the altered figure produced by secondary forces acting upon it. Thus the fluid molten earth, gradually cooling down, became at length of such a plastic consistence externally, as to allow secondary forces to produce irregularities, mountains and valleys, &c., and yet sufficiently firm to retain these irregularities. In the language of the theory, "the indefinite, homogeneous, nebular matter, parting with some of its motion, became a definite, heterogeneous or variegated mass." But as time goes on, these original heterogeneities become still more complicated, and the mountains and valleys become more and more irregular, and greater and greater diversity is the result in inorganic matter.

If, however, during this period of coalescence or aggregation, gases rather than vapourised solids should combine, a different result is produced. The molecular motion in gases is much greater than in solids, and is more slowly lost; and therefore masses composed chiefly, or in great part, of

gaseous constituents will retain their plastic or changeable condition still longer, and will be much more changed in form and character by the secondary forces which act upon them, wherever these forces may come from. Now such aggregates of chiefly gaseous components constitute what is called organic matter, which is much more easily changed in many ways than inorganic matter. One of these secondary forces acting upon it is called "Life," by the advocates of vital force; but when or how the force first begins to act upon the nebulous matter I have not learnt from the expositor of the theory of "Evolution."

Under this secondary force, however, this plastic matter undergoes the same character of changes as those already described, but in a much greater degree; which may be illustrated as follows. The indefinite, homogeneous nitrogen, carbon, water, &c., lose their molecular motion and become something more definite and heterogeneous, or varied, viz., the germinal mass and albumen—say of an ovum. These are at first almost homogeneous in structure, the cells of which they consist being pretty uniform in figure and chemical composition. But under the influence of this disturbing secondary force, some of the cells divide, and become smaller and more numerous,—that is, more varied and heterogeneous,—and the power of division and multiplication continues until at length the cells form a groove, the future spinal cord; this forms segments, the spinal column; further separation and heterogeneity results, and a digestive and circulating system appear; the process of evolution still continues, and projections appear that may be arms, legs, or wings, for they are all alike at first; but evolution, *i. e.*, the aggregation of shapeless matter, accompanied by definiteness and diversity, progresses, and the homogeneous projections become heterogeneous limbs of various kinds.

This system of evolution is progressive, and the simple

homogeneous central ganglia become divided and multiplied, and more and more complicated, and then higher and higher forms of brain are the result. And as thought and feeling are the result of nervous changes (though how they should be produced by molecular motions, is acknowledged to be utterly inconceivable even by the most cultivated imagination), so the thoughts become more and more varied, and wider in their range. The modes of expressing these thoughts become more and more varied, and language evolves from the simple nouns of an infant or a savage, to the complex speech of the educated man. Art, as an offspring of thought, becomes more distinct and varied; and the sculpture, painting, and music of the present day were evolved from the simpler art of primitive times. Government, or the social condition of man, is evolved; so that the indefinite homogeneous ruler of old times is evolved into the heterogeneous rulers of modern times; and the indefinite homogeneous compound of king, legislator, priest, and warrior in one man, separates into the definite heterogeneous development of several men called King, Prime Minister, Archbishop, Commander of the Forces, Magistrate, Superintendent of Police, &c.

Thus, throughout every department of nature, this law of evolution prevails, viz., that more complex and higher forms are evolved from more simple and lower ones; and this process will continue until a result of completeness and perfectness, or of separation into ultimate dissolution and decay, is reached. Which of these it shall ultimately be, the theory does not shew.

In its application to our present inquiry its bearing is, that, as a result of this law of nature, low forms of animal or vegetable life evolve more complicated and higher ones, without any known limit to its operation. Hence, therefore, man may have been, and many boldly assert has been, evolved

by natural descent, through the man-like apes, from the old-world monkeys ; at a long interval from the marsupials ; more remotely still from fishes ; and, still more remotely,—and here for the present his genealogical tree starts,—from the low aquatic creature, the ascidian.

*What amount of confidence is to be placed in these three Laws ?*

Having now examined the agencies by which the development of man is said to be possible, even if not actually to have been produced, we are in a position to enquire what amount of confidence the proposers of these various theories place in them themselves. And, to begin with the last-mentioned, viz., Evolution.

*Evolution.*—Herbert Spencer says (*First Principles*, 2nd ed., pp. 340, 341):—"Hence we may say, that though our knowledge of past life upon the earth is too scanty to justify us in asserting an evolution of the simple into the complex, either in individual forms, or in the aggregate of forms ; yet, the knowledge we have, not only consists with the belief that there has been such an evolution, but rather supports it than otherwise."\*

It is, indeed, but a feeble confidence that we can place in a theory, when its very proposer is obliged to limit himself to the conclusion that the knowledge we do possess only "*rather supports it than otherwise.*"

Still further, in his work, Mr. Spencer speaks in not less guarded, we may perhaps say equally doubtful, terms, about the support given by facts to another portion of his theory (*First Principles*, 2nd ed., p. 370). "To prove that the earth's Flora or Fauna has progressed in Definiteness, is no more possible than it was to prove that they have progressed in Heterogeneity ; lack of facts being an obstacle to the one

\* The Italics are my own, not Mr. Spencer's.

conclusion as to the other. If, however, we allow ourselves to reason from the hypothesis, now daily rendered more probable, that every species, up to the most complex, has arisen out of the simplest, through the accumulation of modifications upon modifications, just as every individual arises, we shall see that there must have been a progress from the indeterminate to the determinate, both in the particular forms and in the groups of forms." That is to say, *there are not facts to prove what we advance*, viz., that the highest forms are developed from the lowest; *but if we accept the hypothesis of evolution*, we shall see that this result must have happened.

It is unfortunate for the author of a theory, when he is obliged to confess that he has not facts from the past to prove its truth; and that such knowledge as we do possess does but "rather support it than otherwise." And it is still more unfavourable if all the inferences from present experience are opposed to it, and nothing can be proposed in the way of experiment, to prove that it will receive more support from the experience of the future than of the past. For the phenomena of life, both animal and vegetable, are, and have been, so strongly in favour of permanence, and opposed to change, either in the direction of increased definiteness, or of increased complexity, that the study of nature, as we are able to observe it, or of experiments, as we can institute them, tends to show that, *when the influence of a controlling mind is withdrawn*, permanence, and not evolutionary changes, is the law of life, as at present existing. And, although it is undisputed that individual life progresses in the direction attributed to evolution, from its earliest embryonic condition to its maturity, we are obliged to confess our inability to see the proofs of this evolutionary theory, as a continually operative law, in races of living beings, whether animal or vegetable.



*Natural and Sexual Selection.*

Darwin, (*Origin of Man*, vol. 1, p. 137, *et. seq.*) says:—  
“Man manifestly owes his immense superiority to his intellectual faculties, his social habits, and his corporeal structure. . . . Through his powers of intellect, articulate language has been evolved; and on this his wonderful advancement has mainly depended. He has discovered the art of making fire, which discovery, probably the greatest excepting languages, ever made by man, dates from before the dawn of history; and these several inventions are the direct result of the development of his powers of observation, memory, curiosity, imagination, and reason.” And the following are the steps, according to the same author, by which his corporeal structure, and his discovery of languages and of fire, have been made:—“As soon as some ancient member of the Primates came to live less on trees, and more on the ground, it would have had to become either more strictly quadrupedal or bipedal. Man alone has become a biped; but he could not have attained his present position in the world without the use of his hands; and they could scarcely have become perfect enough, as long as they were specially adapted for climbing trees; for such rough treatment would have blunted the sense of touch, on which their delicate use largely depends. It would, therefore, have been an advantage to man to become a biped, and to gain this great advantage, the feet have been rendered flat, and various other changes have been produced, connected with man’s erect position.” That is to say, so far as I can master the argument:—“We find an animal that has a superiority over all other races, and there is no doubt (though we are not able to prove it,) that he is a descendant of those ancient primates; but he could not obtain this superiority without having flat feet and perfect hands, and therefore he gained them, though we are not able to show the steps by which it was accomplished.”

I have searched Darwin's book carefully, and I confess my inability to find a more direct proof of the manner in which these changes were affected, than that it was necessary that the ape should so change, in order to become a man, and therefore he did so.

Next, as to the discovery of articulate language Darwin says (p. 54, *et seq.*):—"Articulate language is peculiar to man. When we treat of sexual selection, we shall see that some early progenitor of man probably used his voice largely, as does one of the Gibbon apes of the present day, to express various emotions, as love, jealousy, triumph, &c.; and the imitation by articulate sounds of musical cries might have given rise to words, expressive of various complex emotions. And it does not appear altogether incredible that some unusually wise ape-like animal should have thought of imitating the growl of a beast of prey, to intimate to his fellow-monkeys the nature of expected danger; and this would have been a first step in the formation of language." That is to say, assuming the existence of the unusually wise ape, he growls like a lion, and thus lays the first step in articulate language, which distinguishes man from all other creatures; though, as Darwin observes, a few pages afterwards, (p. 59,) "The fact of the higher apes not using their vocal organs for speech, no doubt depends on their intelligence not having been sufficiently advanced." The reasoning appears to me, so far as I can follow it, to be: "Man is doubtless descended from an ape; but he has articulate speech which apes have not, because they have not brains enough; therefore, some unusually wise ape must have begun to imitate the sounds made by other animals—who, also, do not speak—and thus laid the foundation of language."

At this point we turn again to Darwin himself, who dwells at large upon the increase that would take place in man's intelligence [and brains, when once he had begun to use

articulate speech—which is probable enough. The first grand difficulty of beginning to speak being got over, there is little difficulty in the subsequent advance, both in intelligence and language; the two going hand in hand.

The discovery of fire, by the ape-like ancestor of man, is attributed by Darwin to some monkey having accidentally noticed that, when he happened to strike one flint against another, a spark was produced, and this spark accidentally set the herbage on fire; and the ape, instead of being dismayed, or destroyed by the conflagration, thought of feeding the fire, when it became low, and limited its spread by removing surrounding fuel, and thus learnt to use fire, and employ it for cooking, &c., instead of being destroyed by it. As this theory is based entirely upon assumption, and is unsupported, so far as I am aware, with a shadow of proof, we need not dwell upon it further.

Thus far for the influence of Natural Selection and Sexual Selection, in developing the special characteristics of man. I have endeavoured to represent the author's views faithfully, and will conclude this part of the subject, viz., that in favour of man's descent by ordinary generation from apes, or still lower forms, with Darwin's own concluding words, (vol. 2, p. 405 :)—“The fact of man having risen to the very summit of the organic scale, instead of having been aboriginally placed there, may give him hopes of a still higher destiny in the distant future. But we are not here concerned with hopes and fears, only with the truth, so far as our reason allows us to discover it. And we must acknowledge, as it seems to me, that man, with all his noble qualities, still bears in his bodily frame the indelible stamp of his lowly origin.”

## PART II.—THE FUTURE OF MAN.

The sentence from Darwin, which I have just read, “We are not here concerned with hopes and fears, only with the

truth," and the following sentence from Huxley's celebrated Edinburgh lecture, "Why trouble ourselves about matters, of which, however important, we do know nothing and can know nothing?" will furnish the basis for my concluding remarks; for they appear to me to show that these enquirers (earnest enquirers after truth, we cannot for a moment doubt them to be) have become so much accustomed to regard the subject of man from one point of view only, that they leave out of sight, as if it did not exist, other knowledge that we possess of man, though derived from a different source than that of tracing his descent through the region of comparative anatomy.

*Man must be studied as a whole, not as a mere animal.*

If we would study the whole truth, we must take man as he is, body, soul and spirit, whatever his origin; and not simply regard him in his supposed descent, as a mere animal, from some remote ancestor. If the parentage assigned to him in the foregoing pages can be proved to be true, it must be accepted without fear and without hesitation; for we are sure that the truth can never be an occasion for fear to a truthful mind. And if it be absolutely true that man is descended by natural generation from an ape, there is nothing in this really to shock us, more than our former knowledge that his body is composed of the same materials as the inorganic world around him, and that it is sustained through the nutriment derived from the lower animals upon which he feeds. But before giving up our old beliefs, and renouncing all the hopes and fears with which we really are very deeply concerned, we ought to be very sure that the teachers of the modern philosophy have not overlooked anything which constitutes man, and have not presented to us only a part instead of the whole of the being, in whose present and future we are so momentarily involved.

Now, if we take man as he is, we must not confine ourselves to the lowest and most degraded savages, who form but a portion, and that by far the smallest portion, of the human race, but we must take him in his highest manifestation as well as his lowest, and see what his constitution then is. We have then to account for a being who differs corporeally from all known animals, recent or fossil, in at any rate the following particulars. He is naked, whereas all other animals are naturally clothed. He differs from all known animals in his hands and feet, and the correlated parts of his frame; and his brain, with which all naturalists associate some correspondence in mental power, is incomparably larger in proportion than that of any known animal; the difference being so great, and so entirely unbridged over, that, so far as our knowledge goes, it is entirely without explanation how the difference has arisen. And when we consider his mental characteristics, we find that he has, what is confined to him alone of living beings, not only a remembrance of the past, but also anticipations of the future—anticipations accompanied by hopes or fears, which are so universal in the race that we have no more right to disregard them, as constituting part of his nature, than we should have to disregard the sense of vision in fishes, because some are without eyes.

Now if we enquire whence these peculiarities are derived, we obtain no answer from Natural Selection, Sexual Selection, or Evolution. For, first as to the *naked skin*; Natural Selection can produce nothing but what is decidedly beneficial to its possessor: but the nakedness of man is not beneficial, but is rather injurious to him, in whatever part of the world he may be; for it is abundantly proved\* that, even when he does not require clothes for warmth, he needs them and uses them as a shelter from rain and from heat; and there-

\* Wallace, *Contributions to Natural Selection*, p. 346.

fore Natural Selection is powerless to produce this peculiarity. And the same may be said of Sexual Selection; for the only conceivable benefit it could be, would be to render him more attractive to his mates. But so far is this from being the case, that in nearly all regions of the world the nakedness is more or less covered artificially. And because it is so wanting in attractions, man borrows the coverings possessed by other animals in order to obtain favour in his companions' eyes, and decks himself in the skins of animals or the feathers of birds, or ornaments himself, and hides his deficiency by painting and adorning his skin, so as to render his nakedness less apparent. And "Evolution" also fails to account for it; for it answers to none of the conditions involved in that law of development.

And if, leaving out of the question man's hands and feet, for the origin of which Natural Selection gives a sorrowfully meagre explanation, and Evolution none, we turn to man's brain, we are again met with the fact that its capacity is so out of all proportion to man's needs as a mere animal, or as an uncultivated savage, and is so widely removed from every modification that the known influence of Natural Selection or Evolution could produce, that we are bound to admit, if we are merely concerned with the truth, that no known natural agency has been capable of producing it, and that some agent has fashioned it, which is not simply natural organic descent.

And if, from his corporeal structure, we turn to man's mental characteristics, we find in his conscience what is barely represented even in those animals which have been longest under his tuition;\* and in his anticipation of the

\* In his *Origin of Man*, Darwin labours laboriously to show that there are some animals which have a sort of something which he calls conscience; or, at any rate, some sense of right and wrong, which is developed from their social instincts. He has no difficulty in showing that they act under the influence of hope, fear, and affection; emulation and discipline (as in ants and trained animals); and he adduces a few examples of healthy animals, feeding or tending

future, in his hopes and fears, we find what is entirely without representative in the rest of the animal world. And when we ask the advocate of natural selection as the source of man's development whence this characteristic of man arises, he ignores the whole matter, and replies, "We are not concerned with hopes and fears." And if we inquire from the exponent of physics as the only base of life, what he can teach us, he answers, "Why trouble ourselves? If a man asks me about the politics of the inhabitants of the moon, I answer that I do not know, and I decline to trouble myself about the subject at all." But man, simple, unlearned man, and the philosopher also, notwithstanding this denial, is concerned with hopes and fears, and does trouble himself for an answer. And it is worth while to ask, "Is it really true, or is it only the private assertion of a great naturalist, that we do know nothing, and can know nothing, upon this subject?" Now it is acknowledged that our senses teach us nothing on this matter, and that, if we are to learn anything, it must be from the teaching of some one who knows what our unaided senses cannot teach us.

But in this respect we are only in the same position that we occupy in regard to the teachings of science; for we are told to believe, for example, that in the sun flames of hydrogen twenty-seven thousand miles high appear and disappear in a few minutes; and that some of the stars are moving away from us at the rate of a few miles per second, and we do believe it. But on what authority? for our eye has not seen,

sick ones, to prove that they possess some of the higher attributes of kindness and social qualities. But he fails entirely, as it seems to me, in showing that any animals possess that imperative sense of duty, or of truth, which causes them to make sacrifices, and submit to personal loss, in order to comply with the stern demands of that monitor, which we commonly call conscience, and which manifests itself chiefly as enjoining us that we *ought* to do, or *ought* not to do, what no other faculty gives direction about. On this point, compare Darwin with an interesting chapter in Wallace's *Contributions to Natural Selection*. \*

\* *The Limits of Natural Selection as applied to Man*, ch. x. p. 882. *Truthfulness of some Savages*, p. 858, same Essay

nor our ear heard, neither is it possible for us really to conceive these phenomena. On the authority of some one or two men, who have seen what no one else has seen, and who tell us that it is so. And on what grounds do we believe them? Is it because scientific men have never been deceived or have never contradicted one another? Certainly not; but because those who are supposed to be capable of testing their knowledge say they are to be believed; because they prove their knowledge to a certain extent by explaining obscure phenomena to the satisfaction of our own intelligence; and because, lastly,—and this is the true touchstone of their trustworthiness,—because they foretell with truth the occurrence of future events which do not admit of being guessed at. And if, turning from teachers on such subjects, we turn to teachers respecting our hopes and fears, they must be judged by the same rules; they must be tried by the same tests; and if we are satisfied that they have explained what was previously dark in spiritual matters, and that they have proved by their truthful forecasts of future events that their knowledge was true, then we have at least equal grounds for believing and relying upon their teaching in the matter of our hopes and fears, and in their revelations respecting a future that would be otherwise unknown to us, that we have for believing the announcements of science or the teachings even of naturalists. And if we are possessed of but a little wisdom, we shall follow their instruction how to obtain the future they teach of, as cheerfully as we shall be guided by that of science in our passage over the otherwise trackless ocean. And whether or not our corporeal frame bears marks of its lowly descent and its relationship to the other creatures of the Creator, we shall look forward, and shall rejoice in so doing, to something for ourselves, and for those who have gone before us, far brighter and far more tangible than the prospect contained in Darwin's words, already



quoted; words to my mind inexpressibly cheerless; words which destroy all hope of a future for ourselves, or for the generations gone before us; words which remove all stimulus to that which is good, if it should happen to be accompanied by present self-denial, and all check upon that which is evil, if it is accompanied by present gratification; words, lastly, which reduce ourselves to the level of only more highly advanced brute beasts, whatever they may promise for future generations—"The fact of man having risen to the very summit of the organic scale, instead of having been aboriginally placed there, may give him hopes of a still higher destiny in the distant future." Hopes, that is, for the race of man, but not for himself, after countless future ages of Natural Selection, Sexual Selection, and Evolution.

## THE CENSUS AND ITS RESULTS, AS AFFECTING POPULATION THEORIES.

By EWING WHITTLE, M.D.

THE rapid increase in our population, as revealed by the returns of the recently taken Census, is a subject that must, more or less, arrest the attention of all those who take any interest in the different social problems which are being most anxiously considered in the present day; and it appears to me a profitable subject of study, to consider how the different theories of the laws of the increase and decrease of populations are affected by the results of the Census. It is now some sixty or seventy years since the views of political economists were directed to this subject by Malthus, whose theory of population, with some trivial modifications, has been generally accepted by writers on political economy as unimpeachable up to the present day. Though holding its ground among writers on political economy as a well established principle, it has never yet received the impress of the general support of public opinion. For many years it gradually gained ground, particularly during the long period when a periodical famine in Ireland every summer was the rule rather than the exception. This miserable condition of the Irish population, and, concurrently with this miserable condition, their constantly rapid increase, gave force to the Malthusian theory, and those who could not see that the

theory was based on undoubted truth were looked upon, and freely denounced, as ignorant and prejudiced. But after the fearful famine of 1846 had changed and revolutionised the whole fabric of society in Ireland, and about the same time, the introduction of free trade, and the gold discoveries in California and Australia, had given a great impulse to industry, the popularity of the Malthusian theory sank almost to zero.

In almost every newspaper you would find the views of Malthus treated with ridicule, laughed at, as dreams unworthy of consideration; and, in fact, our increasing population boasted of, as a proof of our advancing in our career of wealth and prosperity. Even since the late Census was published, the same boasts have been freely uttered; and the fact that the population of the sister kingdom has declined in numbers is put forward as a proof that Ireland is retrograding in material prosperity. The freedom with which these views have been expressed is a sufficient proof that the Malthusian theory is by no means generally accepted by public opinion in the present day. After these introductory remarks, I will now briefly state the theory of Malthus, and the few sweeping arguments on which his theory is based.

His first principle is, that the amount of the human race must be in proportion to the amount of food procurable for their support. Secondly, that there is a tendency in the human race to increase faster than subsistence can increase; and that, if subsistence could be provided, they would increase in what might be called an infinite ratio, doubling every twenty-five years—it being alleged that this has taken place actually in America, without counting the increase by immigration. Thirdly, that this naturally rapid increase is only prevented by the positive checks of war, famine, vice, and extreme poverty. The remedy, that he and his disciples have

generally concurred in recommending, for the dreaded result has been virtually the practice of celibacy, under the name of moral restraint. One of his most distinguished followers, McCulloch, says "that the power of increase in the human species, must always, in the long run, prove an overmatch for the increase in the means of subsistence."

J. S. Mill, another eminent authority, says, "That population has a tendency to increase faster than, in most places, capital has actually increased, is proved incontestably by the condition of the population in most parts of the globe. In almost all countries, the condition of the great body of the people is poor and miserable. This would have been impossible if capital had increased faster than population." On this statement Mr. Mill bases his adherence to the Malthusian theory.

Nassau Senior modifies to some extent the theory of Malthus. He admits "that the powers of population, if not restrained by prudence, must inevitably produce almost every form of moral and physical evil." "Sooner or later, the increase must be checked; and we have seen that prudence is the only check that does not involve vice or misery. . . . It may be said, however, and, indeed, it has been said, that while the globe remains in its present irregularly occupied and irregularly cultivated state, emigration affords to all comparatively thickly-peopled nations a resource so ample and so easy, as to render every prudential check to population unnecessary. . . . But all experience shows that no numerous and civilised nation, surrounded by other civilised nations, can venture to rely on emigration as a permanent and adequate check to population. . . . We have the command of unoccupied continents in each hemisphere, the largest navy that the world ever saw to convey us to them, the largest capital that ever has been accumulated to defray the expense, and a population remarkable, not merely for

enterprise, but for enterprise of this particular description. These advantages we have enjoyed for centuries, almost from the time of the Tudors, . . . and yet, during this long period, how little effect has emigration produced on our numbers. The swarms which we have sent out, and which we now send out, seem to be instantaneously replaced. . . . We now repeat, that all experience shows the inability of emigration to keep down the population of any large, well-peopled, and tolerably civilised country, such as Europe, China, or Hindostan. It appears, therefore, that habits of prudence in contracting marriage, and habits of considerable superfluous expenditure, afford the only permanent protection against a population pressing so closely on the means of subsistence as to be continually incurring the misery of the positive checks; and as the former habits exist only in a civilised and the latter only in an opulent society, it appears equally clear that, as a nation advances in civilisation and opulence, the positive checks are likely to be superseded by the preventive. If this be true, the evil of a redundant population, or of a population too numerous to be adequately and regularly supplied with necessaries, is likely to diminish in the progress of improvement. As wealth increases, what were the luxuries of one generation, become the decencies of their successors. Not only a taste for additional comfort and convenience, but a feeling of degradation in their absence, becomes more and more widely diffused. The increase in many respects of the productive powers of labour must enable increased comforts to be enjoyed by increased numbers; and as it is the more beneficial, so it appears to be the more natural, course of events that increased comfort should not only accompany, but rather precede, increase of numbers. But although we believe that, as civilisation advances, the pressure of population on subsistence is a decreasing evil, we are far from denying the prevalence of this pressure in all

long-settled countries. No plan for social improvement can be complete unless it embrace the means both of increasing the production of wealth, and of preventing population from making a proportionate advance. The former is to be effected by legislative, the latter by individual, prudence and forethought." These extracts show that the views of Senior are nearly identical with those of Malthus, McCulloch, and Mill, modified, however, by his confidence in the counteracting effects of rapidly increasing capital.

I will now call your attention to a widely different Theory of Population, and one which is at least recommended to our consideration by its beneficence and ingenuity. This theory was first propounded by Thomas Doubleday, in 1841, and it has not, I think, excited so much attention among writers on this subject as it is fairly entitled to.

He lays down a GENERAL LAW, that whenever a *species* or *genus*, whether vegetable or animal, is *endangered*, a corresponding effort is invariably made by Nature for its preservation and continuance, by an increase of fecundity or fertility; and that this especially takes place whenever such danger arises from a diminution of proper nourishment or food, so that consequently the state of depletion is favourable to fertility; and that, on the other hand, the plethoric state, or state of repletion, is unfavourable to fertility, in the ratio of the intensity of each state; and this, in the vegetable as well as the animal world; further, that as applied to mankind, this law produces the following consequences, and acts thus:—

There is, in all societies, a constant increase going on amongst that portion of it which is the worst supplied with food: that is, amongst the poorest.

Amongst those in a state of affluence, and well supplied with food and luxuries, a constant decrease goes on.

Amongst those who form the mean between these two opposite states, that is, amongst those who are tolerably well supplied with good food, and not overworked, nor yet idle, population is stationary. Hence it follows, that the increase or decrease of the whole, in any society, will depend upon the numerical proportion which these three states bear to each other; in a nation where the affluence is sufficient to balance, by the decrease which it causes among the rich, the increase arising from the poor, population will be stationary. In one highly and generally affluent and luxurious, population will decay; in poor and ill-fed communities, population will increase in the ratio of the poverty, and in consequent deterioration and diminution of the food of a large portion of the members of such communities. This is the real and great law of human population.

Doubleday proceeds to support this theory by numerous illustrations, taken from the experience of gardeners and horticulturists; showing how all trees, vegetables and flowers are rendered unfruitful by being over stimulated with manure or a too rich soil. We are all familiar with the fact, that when flowers are so highly cultivated as to become double, that, though they are more beautiful, they cease to bear seed; in the same way fruit trees and vegetable, if over stimulated, run to stalks and leaves, and the fruit is either deficient or inferior.

We find the same law in action in the animal kingdom. Huber tells us, that among bees the queen is made prolific by being fed by a peculiar kind of bee bread, when in the pupa state; the neuters being in the ordinary state incompletely developed females; some of the neuter larvæ are fed in this way, and so become fully developed queens. It is well known to all breeders of animals, that a plethoric state is unfavourable to fecundity; overfed hens will not lay; overfed cattle do not breed; there is a Yorkshire proverb,

*a lean bull for a get.* Doubleday gives an instance of a highly-bred blood-mare, which for a long time appeared to be incurably barren ; her owner was very desirous to obtain a breed from her, and he succeeded by putting her to the cart and plough, and feeding her sparingly, and so working her down to a state of leanness and temporary exhaustion.

Doubleday gives many illustrations, taken both from ancient and modern history, of the truth of his theory as applied to mankind. He first quotes the very old tradition, that the Ichthyophagi, or feeders on fish, were remarkable for their fecundity ; this was observed by Aristotle. Fish is no doubt a substantial and wholesome article of diet ; but we know that invariably a fisher population are among the poorest of the poor, and that they are more often in absolute want than supplied with an over-abundance ; this has long been the condition of the inhabitants of the western islands of Scotland, where the food is principally fish. The same fecundity, in a still greater degree, existed among the Irish so long as the potatoe was almost the sole article of diet ; and still is in full force among the rice-fed millions of China and Bengal. On the other hand, the population is universally thin in pastoral countries, where the diet is chiefly animal food ; denser, where it is mixed with vegetable food ; but denser still, where it is vegetable only and with plenty ; and most dense of all, where it is vegetable with scarcity superadded.

In Russia, where butcher's meat is a drug and vegetable food a luxury, the numbers to the square league are trifling. In Poland, France, Italy, and the Low Countries, where the diet is mixed, but plentiful, population is moderately dense ; in India, Ireland, and China, where no animal food almost is eaten, and where the vine and the olive are absent, and where, in consequence, oil and wine make no part of the popular diet, the population is excessively dense ; and con-



stant pauperism and periodical famines form decided features in the history of these countries.

These ideas seem to have presented themselves to the mind of Sismondi, an eminent economist; he says, "The slowness in the increase of a population is most frequently an indication of great prosperity; in Geneva, the number of births to a marriage is rather less than three." He adds, "There is no danger here of that subdivision of property with which we are constantly menaced by the English economists."

The fact that the plethoric state was unfavourable to fecundity was recognised by very early writers. Pliny says, in his *Natural History*, "Steriliora cuncta pingua, et in maribus et in feminis." Castiglione, in his *Notes on the History of the Kings of Italy*, says of Charles le Gros, "Carlo per la superchia pinguedine era sterile." On the other hand, Swift observed the converse proposition. Speaking of a certain class of poor Irish, he says, "Here are ten thousand persons reduced to the necessity of a low diet and moderate exercise, who are the only great restorers of our breed." To give individual instances: Prince Troubetskoi was banished to Siberia by the late Emperor Nicholas, his wife followed him into exile, they had been some time married and had no family, in Siberia they had in time a large family. The instance that follows was observed by myself. I know a married couple who had one child about a year after their marriage; the husband had a good salary, and led rather a sedentary life, being a clerk; they lived in apartments, so that, not having a house to look after, the wife had comparatively little to do, and they lived comfortably. I knew them in this way until the child was about seven years old, there was no increase to the family, neither had there been any miscarriages. About this time the husband got into a scrape and lost his situation; for some time they suffered consider-

able privations, and had to work hard for a living. Within two years there were two more children born to them. "Old families," observes Sir Thomas Browne, in his *Hydriotaphia*, "last not three oaks." We have found this to be the case with all aristocracies; several peerages become extinct every year. In 1837, of three hundred and ninety-four peerages then existing, two hundred and seventy-two were created since the accession of George the Third, only seventy-seven years—rather more than two-thirds. The same remark applies to the baronetage. Since the first creation, in 1611, seven hundred and fifty-three have become extinct; of the numbers created by James the First only thirty-nine now remain. Addison makes the following remarks on the decay of the nobility of Venice—"Amelot reckoned, in his time, two thousand five hundred nobles that had voices in the Council; but at present, I am told there are not at most one thousand five hundred, notwithstanding the addition of many new families since that time. It is very strange that, with this advantage, they are not able to keep up their numbers, considering that the nobility spread equally through all the brothers, and that so very few are destroyed by the wars of the Republic." Malthus makes this statement as to the town of Berne:—"From the year 1583 to 1654, the Sovereign Council admitted into the Bourgeoisie four hundred and eighty-seven families; of these in 1783, at the end of two centuries, only one hundred and eight remained." Tacitus relates similar facts of the Roman nobility. Niebuhr tells us that the Spartan aristocracy had so decayed, that, B.C. 250, there were only about seven hundred true Spartans left. Volney has told us how the luxurious Mamelukes, who governed Egypt for four centuries, were never able to maintain their numbers, except by the constant importation of new Georgians from the Caucasus. The history of the Mutineers of the Bounty, and their career on Pitcairn's

Island, strongly corroborates this theory of population. When they were settled on this island, after the murder of the Otaheitan men who accompanied them, they consisted of five European men and ten Otaheitan females. When visited about twenty-four years after, their number had increased to forty-eight; in less than twenty years more, they reached the number of one hundred and eighty persons. Here, on this barren island, the population had, in about forty-four years, increased twelve fold. And what were their means of subsistence? Fishing and cultivating yams. There was no edible fruit on the island, and they had scarcely any poultry, and very few pigs; the few that they had running wild through the island, because they had not the means of keeping them in a domestic state. How can we account for this rapid increase on any other hypothesis than that of their laborious lives and meagre fare? to pretend that it was owing to abundant food would be absurd, for this would be equivalent to asserting that these poor people, whose only food was fish, wild birds' eggs and yams, lived more luxuriously than the nobilities of England or Venice, or the comfortable burgesses of Berne and Geneva. We know, on the contrary, that, for fear of absolute famine, the whole colony removed to a more fertile island, with the humane assistance of the English Government. To seek something like a parallel for this increase, we have only to look to Ireland previous to 1846, and to the Western Islands of Scotland about the same period. In Ireland, at that time, potatoes were almost the exclusive food of the people, and it was found that their numbers increased in what might be called an alarming ratio, until in 1846 they must have very nearly reached nine millions. Nor can this be accounted for on the popular theory that the Irish were prone to contract imprudent marriages, for the returns of the Registrar General show that the number of

spinsters in Ireland is large, compared even with other countries where the population is notoriously scanty. In 1849, his report contains the following tabular statement :

PROPORTION OF SPINSTERS TO THE FEMALE  
POPULATION.

| COUNTRIES. | Females,<br>15 years old and<br>upwards. | Spinsters,<br>15 years old and<br>upwards. | Proportion per<br>cent. of Spinsters<br>to the others. |
|------------|--|--|--|
| Sweden     | 1,032,000                                | 373,000                                    | 36.2   |
| Norway     | 401,000                                  | 165,000                                    | 41.3   |
| Hanover    | 586,000                                  | 231,000                                    | 39.5   |
| Saxony     | 583,000                                  | 215,000                                    | 36.8   |
| Holland    | 905,000                                  | 376,000                                    | 41.5   |
| Ireland    | 2,526,000                                | 1,032,000                                  | 40.8   |

This table sufficiently proves that imprudent marriages alone will not account for the rapid increase of the Irish population. Their extreme poverty and meagre diet fully explain it, on Doubleday's theory. Let us now turn to the Western Islands of Scotland. In 1851, the report of Sir John McNeill on this district was ordered by the House of Parliament to be printed. Sir John's enquiries extended over twenty-seven of the poverty-stricken parishes of the West; and in his report, he compares them with twenty-seven others in the Southern and Eastern Highlands, which, early in the century, were equally Gaelic, and, in many respects, similarly circumstanced in regard to fertility of soil and extraneous resources, but are now prosperous and self-sustaining. From this comparison, it appears that the population of the thriving parishes has been steadily decreasing for many years, while the population of the poor parishes of the West has been rapidly increasing. The following table gives the result :—

|                           |        |                         |                    |        |
|---------------------------|--------|-------------------------|--------------------|--------|
| 1755...Eastern Parishes.. | 59,434 | —                       | Western Parishes.. | 42,562 |
| 1841                      | "      | "                       | 41,989             | "      |
|                           |        |                         |                    | 96,304 |
| Decrease, 29 per cent.    | 17,455 | Increase, 126 per cent. | 53,742             |        |

Here, the enormous increase in the population in the one case, in spite of a condition of chronic starvation, and the steady decrease in the other when the inhabitants were placed in more comfortable circumstances, seem strongly confirmatory of the theory of Doubleday.

Mr. Sadler, in his work on population, has published some tables, taken from the registration of births and deaths in the Metropolitan districts, which appear to show that seasons of scarcity and of prolificness are almost synonymous terms; every year in which wheat was dear, the marriages decreasing in number, with an increase of births in the following year; and on the other hand, whenever a prosperous year was indicated by a low price of wheat, an increase in the number of marriages, followed by a decrease in the number of births.

Let us first contrast a year of scarcity with one of plenty.

| Years.     | Marriages.       | Conceptions.     | Price of Wheat.   |
|------------|------------------|------------------|-------------------|
| 1796       | 73,107           | 268,088          | £ s. d.<br>3 17 1 |
| 1798       | 79,477           | 266,769          | 2 10 3            |
| Difference | Increase...6,370 | Decrease...1,319 | 1 6 10            |

In the year of plenty, we have six thousand three hundred and seventy more marriages than in the year of dearth, and there are one thousand three hundred and nineteen less in the following; thus showing that an increase in the means of comfortable and full living immediately checks

population. Let us now contrast two other years, placing the prosperous year first.

| Years.     | Marriages.        | Conceptions.      | Price of Wheat. |    |    |
|------------|-------------------|-------------------|-----------------|----|----|
| 1799       | 77,557            | 254,870           | £               | s. | d. |
| 1801       | 67,228            | 273,837           | 3               | 7  | 6  |
| Difference | Decrease...10,329 | Increase...18,967 | 5               | 18 | 3  |
|            |                   |                   | 2               | 10 | 9  |

Here we have a year of dearth following a prosperous year; naturally the marriages fall off to the number of ten thousand; and at the same time, the conceptions increase by eighteen thousand; thus proving that a diminution in the means of comfortable living immediately stimulates population.

I will not pursue this argument further, except to observe that, even in the United States of America, it has been found that, in the long settled eastern States, old families are already dying out, and making way for new ones, who gradually rise from the ranks. This fact is directly at variance with the theory of Malthus; if it were correct, these prosperous families should double in numbers at least every twenty-five years. You will perceive that there is a great principle in dispute between these rival schools of economists.

Are the proletarian masses, which so embarrass modern statesmen and politicians, the cause, or the effect, of the poverty and misery that weighs them down? I believe the evidence, that they are the innocent effect rather than the reckless cause, vastly preponderates; and an examination of the results of the recent census will, I think, convince you that the theory, first propounded by Doubleday, ought now to be considered as fully proved.

The population of England and Wales is now more than

double what it was at the commencement of the century. From that time it has been steadily increasing, but in a varying ratio. In the decade from 1811 to 1821, it was as high as 18 per cent. ; this, observe, was during a period of very great depression and distress throughout the whole country ; this ratio gradually decreased until the decade from 1851 to 1861, when it had fallen to 12 per cent. In the decade we have just passed through, the ratio has risen to 13 per cent. The total increase is 2,637,884, against 2,138,615, or, in round numbers, half a million additional increase. Of the two million and a half actual increase, we find the Metropolis alone responsible for half a million, while its outskirts, in some directions, are increasing at the rapid rate of nearly 5 per cent. per annum ; the increase for the most part gathers round the great centres of manufacturing and commercial activity.

TABLE OF DECENNIAL INCREASE PER CENT.

|                    |     |     |     |       |
|--------------------|-----|-----|-----|-------|
| Division I.—London | ... | ... | ... | 15.97 |
| South Eastern      | ... | ... | ... | 17.25 |
| York (shire)       | ... | ... | ... | 18.84 |
| Northern           | ... | ... | ... | 22.82 |
| Eastern            | ... | ... | ... | 6.63  |
| South Western      | ... | ... | ... | 2.40  |
| North Midland      | ... | ... | ... | 9.11  |
| Welsh              | ... | ... | ... | 9.66  |

In this table, we have four districts in which the increase is the greatest, contrasted with four others in which it is the least. This shows that the ratio of increase is greatest where masses are crowded together, and where there are always numbers living in extreme misery ; even in those districts where the increase is least, what increase there is, may be referred to special localities. The increase in Lincolnshire is very nearly absorbed by Great Grimsby and Lincoln alone ;

the same remark applies to the town of Leicester, in Leicestershire. In the South Western district, we have the nominal increase of 2.40 per cent.; and in Wales, the comparatively low rate of 9.66 per cent.: and, if we exclude the mining district of South Wales, the rate will not be more than 6. In Anglesea, Brecon and Pembrokeshire, the population has slightly declined, these being chiefly agricultural counties; while, on the other hand, we have the vast increase ranging from 22.82 in the Northern district, to 15.97 in the district of London;—these over-populous districts not only increasing by the numbers of births far surpassing the numbers of deaths, but by absorbing the increase of the rural districts. The immigration is, however, a comparatively small element in the increase; for, in the three districts surrounding London, with an aggregate population of over 8,000,000, the increase by birth in the ten years amounted to 916,964, while that by immigration only amounted to 72,303. It may be urged that the population increases in these districts because there are better opportunities of obtaining employment in these active commercial centres, and that, in consequence, there is a greater facility of obtaining the means of subsistence; but we know that, even in the most prosperous times, there are very great numbers of the poor in large towns living on the verge of starvation; and it is amongst this very poor class that the greatest increase takes place. In the South Western district we have the very slow increase of 2.40 per cent.; and in the county of Cornwall there is an absolute decrease; this no doubt being owing to the emigration of Cornish miners.

These statistics naturally excite alarm at the prospect of the rapid increase of our numbers; but there is much consolation in the reflection that we have every reason to hope that our resources have increased in perhaps a still greater proportion; this is evidenced by the vast increase in our



trade. This may be illustrated by the increase of 61 per cent. in our imports ; 49 per cent. in our exports ; 29 per cent. in the tonnage of registered vessels ; 34 per cent. in the exports of coal and metal ; and 54 per cent. in the deposits in savings' banks. However, the drawback still remains, that, as our population increases, we must become more and more dependent on foreign nations for supplies, both of food and the raw material for manufactures.

If we turn, now, to the examination of the Irish census, we find a totally different state of things. Instead of a great manufacturing, we have a country almost exclusively agricultural, and with a population, until recently, advancing with rapid strides. Commencing with the first accurate census, in 1821, we have, to 1831, an increase of 13 per cent. ; this rate was fully maintained up to the period of the fearful famine of 1846, at which time the population was calculated at eight millions and a half at least ; and this notwithstanding the extensive emigration which had been going on for several years. Vast numbers fell victims to that famine and to the pestilence of fever which accompanied it, and of cholera which followed it. Swarms of emigrants also fled to seek new homes across the Atlantic ; and the effect upon the population became manifest in 1851, when the census showed that the number of the people had fallen to 6,574,278, a reduction of very nearly two millions in five years. At the time that this census was taken, Ireland was slowly recovering from the effects of the potatoe famine ; and so great was the depression and wretchedness of the people, that, at that time, there were no less than 297,000 inmates of workhouses and hospitals : that is, almost exactly one in every twenty-two of the whole population. As the decade from 1851 to 1861 advanced, there was a slow but gradual improvement in the condition of the people ; the great tide of emigration continued, and, in consequence, wages advanced, and the

people lived on more substantial food ; the potatoe ceased to be the staple article of food, and a steady though slow improvement took place in the habits and condition of the people. This improvement has continued, and, during the decade just passed, has been more marked in character. During the last twenty years, I have visited different parts of Ireland twelve or thirteen times, and I have noticed that there is a steady and progressive improvement in the condition of the people. In confirmation of this statement, I can adduce several undoubted facts. Firstly—Dr. Edward Smith, a year or two ago, was engaged by Government to institute a commission upon the diet of the agricultural labourers in different parts of the United Kingdom ; and he showed that the Irish labourers were, on the whole, better fed than the labourers in most of the English counties. Again, the inmates of the workhouses, amounting in 1851 to 297,000, had fallen in 1861 to 50,000, and in 1871 to 48,900 ; thus falling from 5.2 per cent. to about .9 per cent. Again, the fact that, whenever an opportunity occurs of land being sold in small quantities, the peasants come forward and pay a large price for it in cash ; showing that capital has been largely accumulated in their hands. Very lately, a nobleman in the north of Ireland wished to dispose of an estate, and it has been stated that the tenants themselves offered such large prices for their farms, that no one could think of purchasing the estate as an investment ; as much as thirty-four years' purchase was offered by some of the tenants. Though, unfortunately, there is still a great deal of misery in Ireland, yet the labourer receives higher wages than formerly, and also lives on more substantial food ; in fact, Ireland, during the last ten years, has enjoyed a much larger amount of material prosperity than has fallen to her lot during any previous decade in this century ; and this improved condition at once tells on the population by

considerably diminishing the ratio of increase. In 1861, the population of Ireland amounted to 5,798,967; in 1871, it had fallen to 5,402,759. Here is an absolute reduction in numbers to the extent of 396,208; but this must be corrected by adding the number of emigrants in the decade: this was 819,903. Subtracting the decrease, 396,208, from the number of emigrants, we have the net increase of the Irish people, for this decade, of 423,695, that is, 7.5 increase per cent. per decade; that is a very material reduction in the ratio of increase—about 6 per cent. In 1861, the average number of individuals to each family was 5.14; in 1871, this average was reduced to 5.04. That item alone would account for a difference of 100,000 in the population. In 1861, the uninhabited houses were 40,957 in number; in 1871, there were only 28,322,—a decrease of over 30 per cent. When the people are less numerous, and still occupy more house room, they must be proportionately in better circumstances. This is strikingly exemplified in the case of the City of Dublin. There the population has decreased by 9,086 persons, while the number of inhabited houses has increased by 1,266, and the average number of persons constituting a family has decreased from 4.86 to 4.24.

Let us now consider, in conclusion, how these facts, brought out by the census, affect the different theories which I have sketched in the commencement of this paper. With regard to England, a superficial view of the facts seems to confirm the theory of Malthus; we find the ratio of increase reaching the figure of 13 per cent. per decade,—nearly as great as that of Ireland at the period of her most rapid increase between 1821 and 1846,—and we are appalled at the prospect of the population in time reaching the number of thirty, or even forty millions, and progressing, as in the case of Ireland in 1846, until the means of subsistence become comparatively so meagre that some frightful catas-

trophe would prove the inevitable issue. Chalmers and Whately, and most of the disciples of Malthus, have taught that it is hopeless to expect to relieve this overflow of population by emigration; so that, if we adopt the views of these economists, our prospects are gloomy in the extreme. The views of Senior are more cheerful, and up to the present time our career supports his view, viz., that, though population increases in a rapid ratio, our means of subsistence increase still faster; and this view is supported by the statistics which I have quoted above, showing the vast increase in our trade and income. But this theory has still the weak point—that political and social changes may so affect our trade, or even divert it into other channels, as to prevent its keeping pace with our increasing population. If we look at the results from Doubleday's point of view, on the other hand, we observe that in the last decade the rate has increased to 13 per cent., from 12 per cent. in the previous decade; the last decade being comparatively a period of commercial depression; thus corresponding with the fact that the increase reached 18 per cent. in the decade from 1811 to 1821, that being a period of almost unprecedented depression and distress.

With regard to Ireland, the facts are of a much more striking character; decade after decade the population went on increasing in a very rapid ratio, notwithstanding the drain of an extensive emigration, which seemed absolutely insignificant as a check on the rapid increase; but during the last decade, the food of the people being no longer exclusively the potatoe, we find the ratio of increase falling off nearly one half, and the average number in each family has decreased 0.1. The effect of this check to immoderate increase being that the flow of emigration has actually produced a diminution in the numbers of the Irish people to the extent of 396,208.

This result is very strong evidence in favour of the sound-

ness of Doubleday's theory; for if the Malthusian theory were the true one, the ratio of increase should rather have advanced than receded with the increased comforts of the people and wealth of the country.

I will now sum up, by reducing the foregoing arguments and facts to three propositions, to the truth of which I confidently invite the assent of my audience.

Firstly.—With regard to England, the rapid increase of her population, and their massing together in large centres, are circumstances that demand the anxious consideration of the economist, more particularly as affecting the now important questions of capital and labour.

Secondly.—As regards Ireland, the Irish people have established the fact that a well organised system of emigration affords adequate means for carrying off the surplus of a redundant population; and, consequently, the erroneous views of Chalmers and others, touching the inefficiency of emigration for this purpose, should be considered as completely exploded.

Thirdly.—That the steady decrease in the Irish ratio of increase, *pari passu* with the improvement in the material condition and in the food of the people, clearly disproves the generally accepted theory of Malthus, and strongly corroborates the truth of the theory of Doubleday.

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NOTE.—In the discussion which followed the reading of this Paper, it was objected that the statistics quoted from Sadler, as to the connections between the ratio of increase in the population and the price of wheat, were of too old a date, and that they ought to have been verified by a reference to more recent returns. To meet this suggestion, I append the statistics of ten consecutive years, from 1858 to 1867. To this table I invite the attention of the reader, premising that we cannot expect to meet with such

striking results in the present day, when free trade and free communication have made the prices of food almost the same everywhere, and done away with the great fluctuations that used to occur so frequently in the times of the sliding-scale of duties; yet, notwithstanding this difference, the principle is still evident. These are the returns of the births and marriages in Scotland for ten years; the births of the succeeding year being taken approximately, as the conceptions of the year preceding. We have, first, two cheap years, showing an increasing number of marriages, and a diminution in the number of births; then three dearer years, with a decrease for two years in the number of marriages, and an increase in the number of births; then four cheap years, with increasing number of marriages, and a small increase in the number of births, in proportion to the number of marriages; finally, a dear year, 1867, with a diminution of 1,070 marriages, and an increase of 1,570 conceptions; the increase of the previous year having been only 377. Let it be observed that, in these ten years, the fluctuations in the price of wheat are not well marked; but in this last year, when the rise in wheat was considerably above fifteen shillings a quarter, then the increase of conceptions is excessive, though the marriages are considerably less.

TABLE.

|      | Marriages. | Conceptions. | Price of Wheat per quarter. | Increase or Decrease in Marriages. | Increase or Decrease in Conceptions. |
|------|------------|--------------|-----------------------------|------------------------------------|--------------------------------------|
| 1858 | 19,655     | 106,543      | 45s. 0d.                    |                                    |                                      |
| 1859 | 21,201     | 105,629      | 43s. 7½d.                   | + 1,546                            | — 914                                |
| 1860 | 22,225     | 107,099      | 53s. 8d.                    | + 1,024                            | + 1,470                              |
| 1861 | 20,896     | 107,069      | 55s. 4d.                    | — 1,329                            | — 30                                 |
| 1862 | 20,597     | 109,341      | 55s. 5d.                    | — 299                              | + 2,272                              |
| 1863 | 22,234     | 112,324      | 44s. 9d.                    | + 1,637                            | + 2,988                              |
| 1864 | 22,725     | 113,070      | 41s. 10d.                   | + 491                              | + 746                                |
| 1865 | 23,611     | 113,667      | 40s. 2d.                    | + 886                              | + 597                                |
| 1866 | 23,688     | 114,044      | 49s. 11d.                   | + 77                               | + 377                                |
| 1867 | 22,618     | 115,614      | 64s. 5d.                    | — 1,070                            | + 1,570                              |



## THE PAST AND PRESENT OF OPTICAL APPLIANCES.

BY G. S. WOOD.

IN bringing the subject of this Paper before the Society, I wish it to be understood that I do not aim so much at originality or novelty; but I conceive it to be quite within the range of probability that what I have to say may not lack interest, nevertheless. I suspect that it is a fact that many members of this and kindred Societies are deterred from reading papers before their fellow-members, from a conviction they entertain that their productions evidence a paucity of this element of novelty, and therefore would not be acceptable. I believe this to be a great mistake. My opinion is, that though I may not have much to speak of which can be strictly called *new*, yet the very fact of bringing this or any particular subject—any scientific or philosophical question—before the members, may open up discussion; and thus, though not directly, yet indirectly, prove extremely useful.

It would form a fitting introduction to this Paper to note the progress of the manufacture of glass in the different nations of Europe, especially that of our own country; but the want of space will not permit other than the barest mention of the two kinds of glasses employed in the manufacture of all achromatic combinations, viz., *Plate* and *Flint* glasses.

About the year 1670, great encouragement was given to the manufacture of *plate* glass in this country, by the Duke of Buckingham and others, who, by liberal grants of money, &c., gave such a *stimulus* to its manufacture as ultimately



quite to rival the Venetian and French. This was also the case in the production of *flint* glass, which was first made at the Savoy House, Strand, London; but the hampering effects of Excise duties for the purposes of revenue greatly interfered with improvements in quality as well as quantity; and it may safely be stated that one of the greatest acts of that eminent statesman, the late Sir Robert Peel, was the removal of all these troublesome imposts, thus leaving its manufacture (as all manufactures should be left) *perfectly free*.

The art of forming useful and ornamental articles of flint glass is perhaps the most ancient of all the departments of glass manufacture. The progress of chemistry having been the means of introducing purer materials in the production of this glass, very great progress has been made the last few years. This has been especially so since the "Great Exhibition" of 1851. Most present will remember the character of the English flint glass exhibited at the time alluded to, and its obvious inferiority to the Continental glass. No doubt much of this inferiority became obvious from the superior cutting and engraving of French and Italian glass—this last art especially; but the contrast between the glass exhibited at the 1851 Exhibition and that shown in 1862 was most marked. Even the most superficial observer could not have failed to see this. The brilliancy and beauty of the British cut and engraved glass, exhibited at the last Exhibition, *infinitely* surpassed any and every thing of the kind exhibited by any other country.

To state with certainty the date of the first introduction of what may fairly be called "*optical appliances*," is very difficult. It is with some force that it may be affirmed that they are coeval with the introduction of *glass making*. There seems to be no doubt that a description of lenses and globes of glass was made, as condensers of the sun's rays, at a very early period. Globes of glass as "burning spheres" were

known as early as B.C. 424. The earliest writer on optics was Euclid, who wrote elaborately on the subject, B.C. 300. And though we know that the theory of *vision* as enunciated by this great man was incorrect, yet it is extremely interesting to observe that he was not ignorant of some of the characteristics of "*binocular*" vision. He noticed that, in viewing an object with both eyes, the images of the two objects, as seen by either eye severally, were *dissimilar*, and that he saw dissimilar portions of the objects viewed.

The magnifying power of a bottle of glass is noticed by Seneca,—this in the year A.D. 65,—as also the decomposition of light by angular pieces of glass, or rather that they produced all the colours of the rainbow. He was not aware, strictly speaking, that these colours were the separated constituents of white light.

It is deeply interesting to note how light breaks in on the minds of philosophers, generation after generation, as they lived on their days, plodding on patiently through labyrinths of thought and experiment. And we sometimes feel disposed to wonder that men like Pythagoras, Plato, Euclid or Ptolemy—men of such wonderful powers of mind—should fall into such blunders as they did in regard to the laws of vision. But we should ever remember that we see and know what we do, in great part, by the brains and intelligence of those who have gone before.

A celebrated Greek physician, Galen, who lived between A.D. 130 and 218, wrote very lengthily on "*binocular vision*," and seems to have had very clear views of its laws; and it seems not a little extraordinary that so many centuries should have passed away, as those which elapsed between the time of Galen, A.D. 218, and that of Hassan, A.D. 1100, without any further important discovery in optics. But so it was. Scientific research, being banished from Europe in this interval, found a sympathising spirit in this Arabian philo-

sopher, who flourished about A.D. 1100. He confirmed the views of Pythagoras in relation to the laws of vision; notably that which insists on the fact of the visibility of an object being due to the light received on the eye *from that* object, and the picture produced on the retina, and the effects of this picture being carried by the optic nerve to the brain.

The science of optics seems to have attracted but little attention between the times of Al Hassan and the date of 1214, at which period the great Roger Bacon was born, to whom, by some, is attributed the invention of the telescope and microscope. There can be no doubt, I think, that though he wrote hypothetically and theoretically on this subject, yet the important question, whether he ever actually *made use* of lenses in demonstration of his theories, is fairly open to controversy. And as this brings before us so important an era, opens up in fact so much that is really important and interesting in the history of optical science, I shall make no apology for treating of this part of my subject at some length. To give an extract from one of his own works, it will be seen that at least Bacon was fully acquainted in *theory* with the action of lenses; and, to my mind, something more. He says, after speaking of the *principles* of vision, "Greater things than these may be performed by refracted vision. For it is easy to understand, by the causes above mentioned, that the greatest things only appear exceedingly small, and on the contrary; also, that remote may appear just at hand, and on the contrary. For we can give such figures to transparent bodies, and dispose of them in such order with respect to the eye and the objects, that the rays shall be refracted and bent towards any place we please, so that we shall see the objects near at hand or at a distance, under any angle we please. And thus, from an incredible distance, we may read the smallest letters, and may number the

smallest particles of dust and sand, by reason of the greatness of the angle under which we may see them ; and, on the contrary, may not be able to see the greatest objects just by us, by reason of the smallness of the angle under which they may appear ; for distance does not affect this kind of vision, excepting by accident, but the quantity of angle. And thus, a boy may appear to be a giant, and a man as big as a mountain, forasmuch as we only see the man under as great an angle as the mountain, and as near as we please ; and thus a small army may appear a very great one, and, though very far off, yet near us ; and on the contrary."

This extract goes to show that Bacon was practically acquainted with the *use* of lenses, and that he had actually *tried* the effects of their light-concentrating power under certain circumstances ; and if this be so, I think there are grounds for supposing that he was the *inventor* of the telescope, and, possibly, of spectacles also, *i.e.*, that he was aware of the advantages of employing a convex, or a pair of convex, lenses as a means of improving vision. Bacon died at about the age of eighty-four years ; and, it should be borne in mind, that he therefore must, in the ordinary course of nature, have had many years' experience of defective vision ; and this proposition receives additional force, when we take into account the well nigh certainty that he was a studious man from youth ; therefore I cannot but think that he was familiar with the use of spectacle lenses as such, and was the inventor of spectacles. In support of this view, Mr. Molyneux cites a passage of Bacon's writings, which, if correct, is unanswerable. This "instrument" (referring to a convex lens or segment of a sphere) "is useful to old men, and to those that have weak eyes, for they see the smallest letters sufficiently magnified."

If this passage really has Bacon for its author, it may, I think with all fairness, be stated that he *was*, as we have

hinted, the *inventor* of spectacles. If, in employing the term *spectacles*, we mean a contrivance for holding a pair of lenses before the eyes to correct or improve vision, then the palm should be awarded to Bacon. However this may be, there can be no doubt that they were not in common use for some years after his time. It is stated that Alexander de Spina, a native of Pisa, who died in that city in 1313, having seen a pair of spectacles made by some person who was unwilling that the secret of their construction should be made public, got a pair made for himself, and found them so useful that he at once made the invention generally known. This was probably in the year 1300. The invention of spectacles in their entirety is attributed to Salvinus Armutus, a Florentine, who died in 1317; and it may have been, and probably was, this instrument which de Spina met with, and one of which, as we have said, he caused to be made for himself, and the advantages of which he generously made known. We are disposed to feel it somewhat unfortunate that an instrument of such universal applicability to the wants of man—so indispensable to his well-being, so conducive, to an incalculable extent, to his happiness, and I may say longevity too—should be left in any uncertainty as to its original projector. We cannot too highly estimate the blessings which this simple contrivance brings in its train. I am not aware of any defective vision, arising from malformation of the cornea or pupil of the eye, but lenses are at hand to compensate, if not entirely, yet greatly, to neutralise the mischief. Spectacles, with lenses of a great variety of form, are now employed. There are the well-known double convex and concave, plano convex and concave, perezoscopic convex and concave. The same figures tinted. Then there are the plano convex and concave cylinder lenses, employed where the cornea is itself cylindrical; also angular or prismatic plano convex and concave for oblique vision, and diaphragm

lenses for weak vision—converging and diverging. Let us say, then, All honour to the inventor of spectacles, whosoever he may have been, or to whatever country he may have belonged.

We now come to the telescope, an instrument of scarcely less importance than spectacles.

The invention of this splendid instrument is also involved in the greatest obscurity. This, to me, is not very surprising. In the cases of multitudes of apparatus and mechanical contrivances, it would be simply impossible to point to any individual men as the inventors of them. No doubt this arises from the simple fact that, as a rule, no one man *does* invent an instrument. It is generally the product of an aggregation of the ideas of different men, mostly living at different times. And this, no doubt, was the case with the telescope. I have suggested that Bacon was acquainted with the result of a lens being placed before a distant object, and thus producing a magnified image of the object so viewed. This fact is a simple enunciation of the principles of the action of the telescope.

Baptista Porta, too, was well acquainted with the fact. He was a Neapolitan, and flourished about 1590. There seems to be no reason to doubt that he was acquainted with the further fact of the improvement of placing a convex or concave lens behind the first named; and thus we have all the elements of a telescope. But, though both Bacon and Porta were aware of these results, it does not appear that either of them had any idea of producing an *instrument*, as such; rather it would appear that they were acquainted with the results named simply as a curious fact in experimental research—a mere coincidence—without a thought of following up the discovery, with a view to utilising it, and moulding it into a scientific instrument. Under these circumstances, it cannot be said that the telescope was

invented before the beginning of the seventeenth century. There appears to have been various claimants of the honour of the invention; one especially, a man, described as a spectacle maker, of Middleburg. This was Lipperchey, who petitioned the States General to grant him certain privileges, in consideration of "his invention of an instrument to see objects at a distance."

About this time, too, a claim is put in by Jansen. But Professor Mott, who wrote the history of the telescope, thinks there is some error in attributing to Jansen the fact of having laid claim to the invention of the *telescope*; but thinks that the claim referred to the invention of the *microscope*. Mr. Mott summarises these claims thus: "that on the 21st of October, 1608, Lipperchey was actually in possession of the invention of the telescope; that on the 17th of October, 1608, Adriaaney, of Alkmaer, was also in possession of the art of telescope making, but, for some reason which does not transpire, kept the said invention to himself.

At this stage, the name of Galileo comes before us.

It is stated, that when Galileo was in Venice, early in 1609, he heard something of Lipperchey's instrument, and, feeling the deepest interest in the subject, he at once set himself to discover the principles of its construction; and here comes the important question: Had Galileo, up to this time, *seen* one of these telescopes? He himself states that he had not; and there seems no reason for doubting the assertion. It will of course be seen, that upon this rests the whole gist of the question as to *who* really *was* the inventor. I will give Galileo's own words, from Mr. Mott, in the *Journal of the Royal Institution*. He (Galileo) says, "It is about ten months ago that it came to our ears that a glass had been worked by a Belgian, by the aid of which visible objects, though at a great distance from the eye of the observer, may be seen distinctly. A few days

afterwards the same was confirmed, by a letter of a noble Frenchman, Jacob' de Badoure, from Paris ; all which occasioned me to apply myself wholly to enquire into the cause of this, and to think on the means by which the invention of a similar instrument might be brought about ; in which I succeeded in a short time, assisted by the doctrine of refraction ; and I first procured a leaden tube of an organ pipe, at the end of which I adapted spectacle glasses, both plano on one side, the second concave. Bringing the eye near the concave glass, I saw the objects large enough ; they appeared three times nearer, and nine times larger than if seen with the naked eye. Afterwards I made another instrument, which made objects appear sixty times larger. Finally, sparing neither industry or expense, I succeeded so far as to make an instrument of such excellency as to make the objects seen through appear a thousand times larger, and more than thirty times nearer, than if seen by the naked eye."

Galileo probably made his first telescope about May or June, 1610, and therefore does not seem to have allowed much time to have elapsed between his first hearing of the instrument, and his having mastered the principles of its construction.

From this quotation, it will be seen that even Galileo himself does not claim the honour of being the first *maker of the telescope*. There can be no doubt of his having been well acquainted with convex and concave lenses, and the effect of light falling on their surfaces ; and the fact of his having heard of Lipperchey's telescope, and its wonderful performance, goes to show that there could have been nothing very extraordinary that a mind of the stamp of Galileo's should so soon have mastered the difficulties of constructing a like instrument.

Galileo's telescope was made, as we have seen, in May or June, 1610. Viviani says that it was April or May, 1609,



that the rumours of the invention of the telescope reached Venice, when Galileo was there ; and thus, with this information only, he returned to Padua, and the same night succeeded in finding out the principles of its construction, as we have named.

Referring to the alleged *power* of these instruments, I can hardly believe that the large one named reached the power of a *thousand diameters*, if that is what he means when he speaks of its magnifying power. To say nothing of the lenses being of a simple form, it cannot, I should say, be doubted that they were of a very imperfect figure, and therefore could not bear such power as is ascribed to them ; at all events without very inferior results as regards definition.

This wonderful optical appliance was eagerly imported into England. As early as 1609, Harriott was directing it to the moon. He also made valuable observations on Jupiter's satellites, October 1st, 1610,—nine months after their discovery by Galileo. The earliest telescope used in England, therefore, must have been made in Holland. This appears from a letter written by Sir William Lower to Harriott, concerning his desire that he (Harriott) "would obtain for him some more of those cylinders, as well also some of Galileus books." In a letter, dated July 10th, 1610, Sir Christopher Heyden writes to his friend Camden, "I have read Galileus, and, to be short, do concur with him in opinion, for his opinions are demonstrative ; and, of my own experience, with one of our ordinary trunks, I have told eleven in Pleiades, whereas no eye ever remembers above seven, and one of those, as Virgil testifyeth, is not always to be seen." From this and other facts, Rigaurd regards it as perfectly clear that Harriott and his friend had been in the habit of using telescopes before the discoveries of Galileo were made known to them ; and it appears, likewise, that in 1610 they were manufactured in England. It is thought to

be highly probable by some, that the first Dutch telescopes were made with the eye-glass a *concave*, i.e., the same as the opera-glass of our day; but on what *authority* this assertion is made I do not know. If the old tradition be correct, about the weather-cock visible through one of these "tubes" being *inverted*, the eye-glass must have been a *convex*. Kepler, in a work of his published in 1611, explains the construction of the telescope of Galileo, and names the substitution of one or more *convex* lenses as the eye-piece, though it is supposed that he did not make any of these latter. Father Scheiner was the first to put these ideas into shape, and constructed what has since been called the "astronomical eye-piece." These telescopes were for a long time called "Galileo's tubes," and the "perspective glass." The name "telescope" was given by Demesiano. The word is, I believe, a Greek one, and signifies "far-seeing." So much, then, for the telescope of the ancients.

We now come to what may truly be called a new era in the history of this valuable instrument, *notably* the improvements in the construction of the object-glasses, by which alone perfect definition is attainable. All those previously constructed were very defective in consequence of the refractive and chromatic error. The constituents of white light, passing through a simple lens, become separated, or focus at different points, due to their different refrangibilities. So that a magnifier, or eye-glass, placed beyond, is acted upon by the light from two or three images, resulting in want of definition and freedom from colour. The object, then, to be attained, was to cause all these rays to meet at *one point only*; and, in the accomplishment of this grand object, the name of John Dollond stands of course first and foremost, as the inventor of the achromatic combination for telescope object-glasses.

This invention of Dollond may, indeed, be said to have

introduced quite a new era in the character of the telescope. Up to the time of this invaluable discovery, the refracting telescope was by no means a satisfactory instrument. To obtain anything like a high power, a very *long focus lens* had to be employed for the object-glass; thus giving a cumbrousness to the instrument, which withal was very feeble in light, and imperfect in definition.

This justly celebrated man was born of very humble parents. He was the son of a French refugee, who, with others, had settled at Spitalfields, London, and there carried on his business as a weaver. His son John was born June 10th, 1706. He passed some of his earlier years in working at the mechanical business of his father as a silk weaver. But he early gave evidence of great natural talents and aptitude for learning, and soon grew tired of his father's line of business, and devoted his time to the study of mathematics and natural philosophy. He also cultivated the science of anatomy, and, as a linguist, the Greek and Latin languages, as also French, German, and Italian. But it is his character as a mathematician with which we have especially to do, and to the successful attainment of which we are so greatly indebted to him. He married early in life, and had two sons and three daughters. His eldest son, Peter, was apprenticed to an optical instrument maker, and subsequently established himself as an optician in London; his father joining him in business in 1752. About three years after this, the elder Dollond commenced a series of experiments and mathematical calculations, which culminated in the establishment of the true theory of the refraction of light, and the construction of the achromatic object-glass. A man of such consummate genius could not long remain unknown. He communicated some of his experiments to the Royal Society, and had the advantage of the friendship of the celebrated Mr. Short, who brought the results of

Mr. Dollond's labours before that Society. This was in 1752; but it was not until five years after this that his patient working was rewarded by the production of the achromatic in its entirety; and this not by accident, but by working from correct data, based on the soundest mathematical principles. Such a long series of experiments, having for their object the elucidation of such an abstruse subject as the laws of the refraction of light, demanded the greatest possible care in experimentalising, and the closest calculations; but to a mind of the calibre of John Dollond's all difficulties faded away. It was in the beginning of the year 1757 that he made the decisive experiments, resulting in such important ends. These experiments ran in the direction of ascertaining the relative refractive values of water and glass. He substituted one form of prism for another, and was able to come to the important conclusion that light, in passing through a prism of a certain angle, immersed in a prism of water, was colourless when the refraction of the water was one-fourth greater than that of the glass. He next sought to construct achromatics of water, enclosed between two lenses; but finding this untenable he abandoned it, and was thrown back on trying the refractive powers of different kinds of glass, and found that the refractive powers of flint and crown bore such a relation to each other as met the requirements he represented to himself as indispensable,—these refractive powers being in the proportion of two to three,—and conceived that a convex lens, formed of these two glasses, would produce a colourless image, giving the focal distances their due proportions. Thus much, then, in overcoming chromatic aberration. But he found the spherical aberration interfere with correct results from the *curvature* being so *great*; but, in employing two separate lenses, he had *four* surfaces at his disposal; he was therefore enabled to make the aberrations of the two lenses

equal; and as these were in opposite directions they corrected each other. He subsequently made some object-glasses *triple*; and though this would have the effect of losing light, yet it had the advantage of enabling him the more easily to correct spherical aberration.

We cannot but feel greatly indebted to Mr. Dollond for his untiring perseverance. It is rarely we find a man, embarking in a new train of thought, having for its object the production of a new instrument, reaching perfection at once. For, though it may be asserted that superior achromatics have been produced, both in regard to defining power and diameter, yet it is certainly true that the formulæ conceived, and so patiently worked out by John Dollond, are those employed in the manufacture of all object-glasses at the present day.

Such invaluable service rendered to science by these discoveries were not long unrecognised. The Royal Society awarded to John Dollond the Copley medal for the year; and, in 1761, he was appointed optician to the king, and was elected a Fellow of the Royal Society. He died on the 30th September, 1761. Since the time of Dollond, great improvements have been made in the manufacture of glass, as also in the mode of working the lenses; and achromatic object-glasses of moderate diameter can now be obtained of most respectable opticians.

Some fine glasses have been produced on the Continent. Fraunhofer has turned out some fine ones. One of his, working now in the Observatory at Dorpat, has a clear aperture of 9.6 inches. The French, too, have also worked some good glasses; one, by Cauchoix, of Paris, some few years since, which was, I believe, purchased by Sir James South for a thousand guineas, was 11.7 inches in diameter; but I believe the production of this glass was quite exceptional; they do not, as a rule, produce good glasses beyond

five inches. Mr. Alvan Clark, of Boston, United States, has made a few good achromatics; and one of his, now in the possession of that indefatigable observer, Mr. Huggins, is of very superior quality. It is of eight inches diameter, ten feet focal length, and, in certain states of the weather, is capable of bearing a power of 1000.

The late Rev. W. R. Dawes, too, had a remarkably fine glass by the same maker, but of much smaller diameter. I believe five-and-a-half inches. The honour of producing the largest achromatic object-glass combination must be awarded to the late Mr. Cook, of York. This glass has an aperture of about thirty-two inches, certainly a most gigantic affair; but, from all I can learn as to its performance, I should say that Mr. Cook himself was not satisfied with it. There can be no question that the greatest difficulty to be met with, in making these enormous glasses, is the obtaining metal of truly homogeneous character. It is just one of those imperfections that cannot be compensated for by any subsequent manipulation. The material of which Mr. Cook worked this glass was made by Chance, of Birmingham; and, taking its size into account, it is doubtless the most perfect piece of optical glass ever produced. This leviathan object-glass is now the property of Mr. Newhall, who, I believe, intends ultimately to have it erected at Gibraltar.

My opinion is, that instruments of such dimensions as the one just named, while interesting, and evidencing considerable enterprise and skill, both in the manufacture of the glass, and also in working out the curves, are, for real work, of little value. For all practical purposes, a six-inch object-glass is amply sufficient; and I am supported in this opinion by the fact, that that hard-worker with the telescope, the late Sir John Herschel, made the major part of his discoveries with a five-feet instrument; indeed, the same instrument I have just named as having been the property

of the late Rev. Mr. Dawes. As I am again naming this most careful observer, I may be pardoned a slight digression, to mention a deeply interesting incident in his early life, and in connection with this instrument. Mr. Dawes happened to be preaching in the neighbourhood of the residence of Sir William Herschel, and became his guest for a few days. As a matter of course, he was introduced into the observatory, and he (Mr. Dawes) was much interested in viewing some of the heavenly bodies through one of the telescopes. Sir William had an engagement which necessitated him leaving Mr. Dawes to himself for some hours; on his return, about eleven o'clock, he was surprised to find him where he had left him, quite absorbed in the observations he had been able to make by the splendid instruments around him. Sir William ultimately left Mr. Dawes to himself for the night, reminding him that he could find his way to his own room when he became tired of star-gazing. On Sir William rising on the morning of the next day, he went at once (as was his custom) into his observatory, and, to his astonishment, found Mr. Dawes there again,—or rather that he had been there all the night,—diligently pursuing his observations, not having moved from his post. Sir William was so struck with the enthusiasm of Mr. Dawes, that he at once made him a present of the telescope he had been using, which instrument was this one of Alvan Clark's. An additional interest attaches to this telescope (if I am rightly informed), as being that made use of by the late Sir John Herschel when he discovered the planet "Georgium Sidus."

As to the question whether we are likely to have any further improvements in the manufacture of achromatic telescopes, it is, I think, difficult to decide. There can be no doubt that, before we *can* have any further improvements, we must have more perfect material of which to make

them—more uniformity in density, and greater refractive power.

And now, to trespass on your time only for a few minutes longer, I will conclude this Paper by offering a few remarks on *reflecting* telescopes. The reflecting instrument was the invention of Father Mersenne, a Frenchman, in the middle of the seventeenth century, by which chromatic aberration was superseded. This was a most important move towards perfection in telescopic observations. The main feature of these instruments is, as is tolerably well known, the having a concave mirror, on which the rays of light are received, and from thence are thrown forward to a certain point, and the image thus formed magnified by means of the eye-piece; but the construction has varied in details. Thus Newton's plan was, to have a small plain mirror, inclined at an angle of  $45^\circ$ , near the point where the rays met, to throw them on one side of the tube or body, and there to place the eye-piece. That suggested by Gregory had a small aperture in the centre of the large speculum; opposite to this he placed a second mirror, of an inch or less in diameter, in the axis of the larger one, and thus the image is viewed through the eye-piece of the speculum. In this arrangement, the observer views the image in a line with the tube and the object itself. In that of the Newtonian arrangement, the observer is at the side; and, from this last circumstance, it is extremely convenient when viewing objects in the zenith, or approximately so. Cassegrain's plan was a modification of Newton's. Herschel's plan differed from all these. He inclined the large speculum in order to throw the light to the extreme edge of the upper opening of the tube, so that the observer sat with his back to the object under observation. This was the plan he adopted in the large instrument which he erected at Slough in 1789, which had a diameter of four feet. This



instrument has, in regard to *size*, been quite eclipsed in our own time by the leviathan instrument of the late Lord Rosse.

This form of instrument offers such advantages to the observer in the way of convenience of posture while observing, that I am not surprised it still finds so many adherents. But all reflectors have a most serious drawback in the way of liability, amounting almost to a certainty, of becoming oxidised ; and when one has become so deteriorated, nothing, but going through the whole process of re-working, can restore it to its original efficiency. It is a simple matter to remove the tarnishing by a hand process ; but in so treating a speculum, however perfect its original figure may have been, this is certain to ruin it. From these facts, I have formed the opinion that reflecting telescopes should be in the hands only of the amateur workman. As successful workers of metallic specula may be named Ramsden, Short, Reichenbach, and others.

Much has been done and said of late about glass-silvered specula. The performances of some of these instruments, worked by Mr. With, of Hereford, have been good ; but they oxidise sooner than a good *metallic* speculum ; and though it is true that they can be re-silvered at a nominal cost, yet I have to learn why, in the process of hand polishing, there should be an immunity from spoiling their figures any more than in the metal specula. From these and other circumstances, I have no hesitation in saying, that, in this country at least, where humid atmospheres so prevail, the refracting telescope will ever remain the favourite instrument among the star-gazing fraternity.

## LANDMARKS IN ENGLISH CONSTITUTIONAL HISTORY.

By J. A. PICTON, F.S.A.

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### SYNOPSIS.

The continuity of English institutions—Difference in this respect from Continental history—Capacity for self-government possessed by the Low German races—Traces to be found in Cæsar and Tacitus—The principles involved—Migration to England—Institutions of the Anglo-Saxons—The effects of the Norman Conquest—Inferences from Domesday Book—Rise of the feudal system—Continuance of the fundamental Saxon institutions—Evils of the feudal system—Influence of the Church—Saxon institutions in the reign of Henry I.—Objects of Henry II.—Abuses of the sacerdotal jurisdiction—1st Landmark: The Constitutions of Clarendon, A.D. 1164—Assize of Clarendon—Assize of the Forest—First taxing of chattels—Commission under Richard I.—Reign of John—2nd Landmark: The Great Charter—The nature of it—Thirteenth century—Fiscal difficulties—Growth of the representative principle—Summons to arm—Provisions of Oxford—3rd Landmark: The issue of Writs to the Boroughs, 1204—Reign of Edward I.—4th Landmark: The Statute of Mortmain, A.D. 1279—Writs for distraint of knighthood, A.D. 1278—Statute of Westminster—5th Landmark: Statute "Quia Emptores," A.D. 1290—6th Landmark: "De Tallagio non Concedendo," A.D. 1297—Circumstances which led to this—The Petition of Right—The Bill of Rights—The Habeas Corpus Act.

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THE most remarkable feature about the history of England is the continuity of its institutions. In the words of our poet laureate, language not more poetical than true, our country is hailed as—

" A land of settled government,  
A land of just and old renown,  
Where freedom broadens slowly down  
From precedent to precedent."

In this respect, England differs from almost every continental nation. To say nothing of France, which in the last century deliberately cut herself adrift from all traditions and associations of the past, it will be found that both Germany and Italy, partly owing to their innumerable subdivisions of territory and changes of dynasty, and partly from the want of sympathy and co-operation between the different orders of society, have lost, to a very large extent, that traditional and historical connection of the present with the past, which is the peculiar glory of England.—I say advisedly of *England*, for it is to the south of the Tweed that the flame of freedom has been kept alive in the darkest hour; and never in the worst of times allowed to be utterly extinguished. Ireland, unfortunately, has never known or appreciated true freedom at any period of her history; and Scotland, until her union with her southern sister, passed through continual paroxysms of despotism, alternating with turbulence and anarchy.\*

It is a singular fact that the capacity for self-government seems to belong, in a peculiar degree, to the Low German races, the Saxons, the Angles, the Flemings and Hollanders, and, in a lesser degree, to their Scandinavian kindred. However this may be, it has certainly not developed to anything like the same extent amongst the other races of the earth. Its germ will be found to exist in the earliest accounts we possess, in the pages of Cæsar and Tacitus, of

\* L'Angleterre est le type le plus parfait de la marche régulière des États sortis de la féodalité du moyen âge, puisque sans rompre avec sa royauté, avec sa noblesse, avec ses comtés, avec ses communes, avec son Eglise, avec ses universités, elle a trouvé moyen d'être l'État le plus libre, le plus prospère, et le plus patriote qu'il y ait."—ERNEST RENAN, *Reforme Intellectuelle et Morale*, 1871.

This idea of continued and uninterrupted development is one that seems absolutely to over-ride our age. It is scarcely possible to open any real and able book on any subject without encountering it in some form. It is stirring all science to its very depths; it is revolutionising all historical literature."—LECKY, *History of Rationalism*, i. 183.

the primitive inhabitants of the German forests. The two great principles on which all true liberty must be based,—personal, individual freedom, limited only by necessary restrictions, and mutual responsibility between the governors and the governed,—may be traced through all the devious course of the Anglo-Saxon history; sometimes obscured and hidden under a cloud, sometimes breaking forth into violence and outrage; but at length gaining the ascendancy, and, finally triumphant, gradually pervading all our institutions, moulding the national character, and bringing all our laws into harmony with justice and right. The story is a noble one, and has been often told. In the glowing pages of Macaulay it shines with attractive brilliancy; and in the more philosophical treatises of Hallam and Palgrave we may see realised the truth of the maxim that—

“ Freedom’s battle once begun,  
Bequeathed by bleeding sire to son,  
Though often lost is always won.”

I am not about to repeat the tale; my task is a much humbler one. Of late years, much fresh light has been thrown upon our early history by the publication, under Government sanction, of original documents. A very strong feeling prevails at the present day to go to the fountain-head for all historical information; and, where contemporary evidence exists, to be satisfied with nothing less. The feeling is a proper and correct one, and has already produced very valuable results, and changed the aspect and bearing of many passages in our national history. The growth of the principles of freedom, mentioned above, is indicated by public documents at successive epochs in our annals; and the object of this Paper is simply to bring prominently forward a few of the most important, as “landmarks,” significative of the feeling of the periods when they were issued,

and the progress made in our national life from time to time.\*

I have already stated that for the germs of English liberty we must refer to our early ancestors beyond the German ocean. Cæsar gives but a vague description; but in the epigrammatic pages of Tacitus we get a very clear and distinct glimpse of their principles of government.

The ultimate source of power was the general assembly, which every freeman had the right to attend.

"De minoribus rebus principes consultant, de majoribus omnes; ita tamen, ut ea quoque, quorum penes plebem arbitrium est, apud principes pertractentur. . . . Ut turbæ placuit, considunt armati. Silentium per sacerdotes, quibus tum et coercendi jus est, imperatur. Mox, rex, vel princeps prout ætas cuique, prout nobilitas, prout decus bellorum, prout facundia est audiuntur, auctoritate suadendi magis, quàm jubendi potestate. Si displicuit sententia, fremitu aspernantur; sin placuit, frameas concutiunt."†

With very little change, this description would apply to an English public meeting at the present day. In these assemblies, Tacitus states, the *ealdermen* were elected, to administer the laws in the villages and hamlets.

As to the government, he continues: "Reges ex nobilitate, duces ex virtute sumunt. Nec regibus infinita aut libera potestas; et duces exemplo potius quàm imperio; si prompti, si conspicui, si ante aciem agant, admiratione

\* For most of the statutes and charters quoted in this Paper, I am indebted to Professor Stubbs's recent work, *Documents Illustrative of English History*, a most valuable repertory for students.

† "On minor matters, the *ealdermen* take counsel; on greater ones, the whole people; but yet, so that whatever has to be decided by the people is investigated by the *ealdermen*. . . . They sit down, as they please, armed. Silence is commanded by the priests, who have also the power of enforcing it. By-and-bye, an *ealderman*, or one distinguished by age, or nobility, or honour in war, or eloquence, is listened to, more from the power of persuasion than the authority of command. If the discourse displeases, the speaker is groaned down; if he is approved, the assembly brandish their spears."

præsunt. Cæterim, neque animadvertere, neque vincere, neque verberare quidem, nisi sacerdotibus permissum ; non quasi in pœnam, nec ducis jussu, sed velut deo imperante, quem adesse bellantibus credunt."\*

The settlement in England, by the Saxons and Angles, was a migration rather than a mere conquest. The country was probably thinly peopled, and the inhabitants either driven westward, or absorbed into the conquering race and converted into slaves. We have some evidence of this fact from the term "*nativi*" or natives, applied to the servile class, contracted in the Anglo-Saxon tongue to *neifs*.

The organisation of society which existed in their fatherland was imported in its entirety into the land of their adoption. The settlements were for the most part made in tribes or families, which gave their names to the chief places of their abode. The "mark" was the unit of the Saxon polity, divided into the wicks or townships; (the *vicus* of Tacitus, as the mark was the *pagus*.) A union of marks formed the hundred (the *centenus* of Tacitus); the union of several hundreds constituted a *shire* (the *populus* or *civitas* of the Roman historian).

The population was divided into the free and unfree. Every freeman had a portion of land, appropriated to himself, and certain common rights over the *folk* land, or that belonging to the community; the possession of land being essential to the exercise of political rights. Those who were not possessed of land, or who had parted with its possession from any cause, took a lower position, and degenerated subsequently into serfs, "*adstricti glebæ*," attached to the soil

\* The kings are chosen for their noble blood ; the commanders for their bravery. The kings have not unlimited or unrestricted power ; and the commanders lead rather by example than command. If they are prompt and conspicuous, and come to the front in the line of battle, they take the lead by acclamation. Further, no one except the priest is permitted to punish, or bind or scourge any one ; and this, not as if for a penalty, or by order of the commander, but as if God himself commanded it, whom they believe to be present amongst the combatants.

which gave them a sustenance, but subject to the authority of the proprietor. The bondmen or *theows* were personal slaves, either captives taken in battle or criminals punished for offences.

From the earliest period there had always existed difference of rank amongst the free members of the state. There were *thegns*, or nobles, of different degrees, regulated according to the tariff of the *Wergyld*, or price of blood in case of manslaughter, payable to the relatives. Such was the relative status of our Saxon forefathers in their personal relations. Let us now see what were their political privileges.

The community of the smallest hamlet had an association of their own for mutual protection, called the '*frithborh*' or frankpledge. The district of the *mark*, equivalent to what subsequently became the parish, had its own corporate existence. The hundred comprised a union of the separate *marks*, under an officer called the "hundred man," who presided in the "hundred moot" or assembly, and acted as judge in the hundred or Wapentake Court. He also led the men of the hundred in time of war.

A cluster of hundreds formed the shire, having at its head the "ealderman" or earl, who was appointed by the great council of the nation. Under him was the *gerefa* or sheriff, who transacted the fiscal business. The shire-moot or folk-moot was the final Court of Appeal, in which every freeman had the right to attend and take a part, either in person or by deputy. The "witena-gemot" or great council of the kingdom was not an elective body. It consisted of the king, with his councillors, the bishops, the earls or ealdermen, and frequently the sheriffs. This assembly had the power of levying taxes, making general laws, regulating the public lands, and of nominating the bishops, ealdermen, and sheriffs. All the lands held by freemen were subject to what was called the "trinoda necessitas" or threefold obli-

gation—those of contributing towards the defence of the kingdom, towards the building of bridges, and the keeping up the fortified places. On extraordinary occasions, the witan had the power to levy further taxes, such as the “Dane-geld,” for repelling the Danes, or “ship-geld,” for providing a fleet.

This is, in the fewest possible words, an outline of the Anglo-Saxon constitution in its general principles. During the five hundred years which elapsed before the Norman Conquest, the details of course varied considerably, and the hand of violence frequently, for a time, set at nought the popular rights; but the native instinct of the people never lost sight of the great landmarks of personal freedom and mutual responsibility.

As society advanced, there was naturally a greater tendency towards centralisation, and lodging more power in the hands of the king and his council.

The ascendancy of the Danes tended in the same direction. Canute, one of the wisest princes who ever occupied the English throne, found it necessary to entrust the government of the kingdom into the hands of a small number of great earls directly responsible to himself, thus initiating the first step in the direction of the feudal system. At this time, the system of heriots is first recognised, under which a tenant holding by service pays a considerable fine, in money or goods, on entering into his succession. The provincial organisation of “burh-gemots,” “shire-gemots,” &c., where the people freely met, are not only recognised in the “dooms” or ordinances of Canute, but are directed to be regularly held. In the reign of Edward the Confessor, a further approximation was made towards the feudal system by grants to the Norman adventurers who flocked to his court; the essence of feudal grants being that they are given conditionally, and under certain circumstances can be reclaimed.



The Norman Conquest, in the first instance, effected fewer changes than is generally supposed. The first William, with all his rapacity and violence, was a politic Monarch, and did not all at once outrage the feelings of his new subjects. Although the great Norman families, the De Lacies, Montgomeries, and others, received very large grants of territory, yet for some time neither the actual occupiers nor the immediate owners were disturbed.

In the Domesday Register of West Derby Hundred in Lancashire, which contains a very detailed and minute account, all the immediate owners bear Saxon names. One Uctred held 17 manors in his own hands. In this Hundred, the large manor of West Derby, with its six Berewicks or dependencies, belonged to the Crown. According to Domesday, Roger de Poitou had recently divided this possession amongst several of his Norman adherents—Goisfrid, William, Warin, and others. The first part of the Domesday survey was issued in 1086, so that twenty years after the Norman Conquest little or nothing had been done in Southwest Lancashire towards dispossessing the Saxon holders. Not long after this, however, whether arising from complicity with the great Northern insurrection, or from sheer lawless violence, great changes took place. The Saxon thegns were displaced, and extensive grants were made to the Norman adventurers, such as the Norreyses of Speke, the Molyneuxs of Sefton, the Blundevills or Blundells of Ince and Crosby, the Gerards of Bryn. In this way, the new régime soon extended over the whole kingdom. The shires became counties, held as fiefs from the Crown; the townships were turned into manors, again subdivided into knights' fees held by military service under the tenants in chief. This change took some time to accomplish, and in the course of the alteration, much hardship was endured by the native population. The Norman adventurers were rapacious and greedy,

and in many cases violently ejected the English freeholders from their possessions. This change was almost entirely completed before the end of the reign of William Rufus. At that period, the Anglo-Saxon population was at the lowest point of prostration. In many cases, extensive tracts of cultivated land were laid waste, to form deer forests and parks for the king and the great nobles. Much of the land went out of cultivation. In the towns, districts of houses were demolished to build castles, and the exactions were so great that several of the cities became almost deserted. Every thing English was for a time proscribed. Norman names were applied to all offices of state, and to every branch of administration, as far as practicable. To be called an Englishman was held amongst the Norman barons as the greatest insult which could be offered. This was not altogether the fault of the Monarchs. The first William published an order that the laws of the time of Edward the Confessor should be confirmed in all respects, with such additions as he had made and issued.\* The second William, though himself a violent ruffian, who feared neither God nor man, found it politic to conciliate the native population, and to solicit their aid against his own vassals.†

The fact was, the Norman monarchs in the establishment of the feudal system had raised a spirit which they could not quell. Lawlessness and violence were its necessary concomitants, until it became at length too oppressive to be longer tolerated. In the early part of the twelfth century, this system had reached the highest state of development to

\* "Hoc quoque precipio et volo, ut omnes habeant et teneant legem Edwardi regis in terris et in omnibus rebus, adauctis iis quæ constitui ad utilitatem populi Anglorum."—*TEXTUS ROFFENSIS*, M.S. BODL. *Proclamation of William I.*

† "Rex videns Normannos pene omnes in una rabie conspiratos, Anglos probos et fortes viros, qui adhuc residui erant, invitatoriis scriptis accersivit; quibus super injuriis suis querimoniam faciens, bonasque leges et tributorum levamen, liberasque venationes pollicens fidelitati suæ obligavit."—*WILL. MALMESB., lib. 4, 306.*

which it ever attained. Let us take a cursory glance at its leading features.

The king, according to the feudal theory, was the owner of the entire soil of the whole kingdom, with all the privileges and advantages thereto appertaining. The country was parcelled out by grants from the crown amongst the great nobles, who held their possessions by the obligation of military service whenever called upon. These were the tenants in chief, who took the place of the old Saxon witenagemot as the great council of the nation. Under them came the lesser barons, who owed to their chiefs the same services as they rendered to the crown in return for the lands which they held. Then followed the knights or chevaliers, who held a certain quantity of land as a knight's fee, on condition of personal service with horse and armour. These constituted the governing class. They were not entirely of foreign extraction, as many of the English *thegns* had continued to hold their lands by accepting the feudal conditions. Each baron had jurisdiction within his own domain, in many cases of life and death, and each manor had a court of its own.

Below these came the native population, in descending orders and degrees. There were first the free men, or tenants in socage, who rendered for the lands which they held either a money payment or some equivalent service. There were the *radmen* or *radchenistres*, who served upon occasion with a horse. There were the *bordarii*, who held by menial services, and who could not alienate without consent of the lord. Then came the *vilains*, or serfs, who were adstricti glebæ, attached to the soil, the *theows* of the Saxon period. Lastly, there were the *servi* or personal slaves, who could be bought and sold.

At first sight, this system, complete in itself, would seem to have extinguished all the the Anglo-Saxon customs and

franchises, but this was far from being the case. Side by side with the Norman intrusion, the old institution of frank pledge, or frithborh, the unit of self-government, and the origin of trial by jury, still existed. The hundred or wapentake courts still judged civil causes within their limits, and the comitatus, or county jurisdiction, and the assemblies still continued. Indeed these institutions were distinctly recognised and sanctioned by the conqueror himself.\*

Early in the twelfth century, the evils of the feudal system had begun very distinctly to manifest themselves. The quasi independence of the tenants in chief led to internal disputes and quarrels, which resulted in appeals to arms. The very word *feud*, in its modern meaning, is commemorative of the constant state of disorder in which the country was plunged. Strong within their own jurisdiction, and in the allegiance of their vassals, the great barons, when banded together, were able to meet on equal terms, and even to overcome, the power of the crown. Oppression and lawlessness were the natural result, until both the monarchs and the people longed for deliverance.

The first ray of light pointing to a better state of things emanated from the Church. The Norman conquerors were able to spoil the country and oppress the inhabitants; but a countervailing influence was found in the religious feeling, or it may be in the superstition, of the time. In the eye of the Church, and before the altar of God, all men were equal, and equally eligible for the sacred offices. In the words of Macaulay—"At a time when the English name was a reproach, and when all the civil and military dignities of the kingdom were supposed to belong exclusively to the

\* "Omnis homo qui voluerit se teneri pro libero sit in plegio. . . . Requiritur hundredus et comitatus, sicut antecessores nostri statuerunt."—TEXT. ROFF. *Proclamation of William I.*

countrymen of the conqueror, the despised race learned with transports of delight that one of themselves, Nicholas Breakspear, had been elevated to the Papal throne, and had held out his foot to be kissed by ambassadors sprung from the noblest houses of Normandy."

The Church, to the offices of which the humblest Saxon serf as well as the highest Norman baron was equally eligible, claimed exemption from the jurisdiction of the baronial and royal courts. William the Conqueror, whilst distinctly refusing to sanction the appointment of any bishop unless approved by himself, at the same time conceded the withdrawal of all causes in which ecclesiastics were concerned, from the temporal courts. "That the sacerdotal order should encroach on the functions of the civil magistrate would in our time be a great evil. But that which in an age of good government is an evil may, in an age of grossly bad government, be a blessing. It is better that mankind should be governed by wise laws than by priestcraft; but it is better that men should be governed by priestcraft than by brute violence." \*

Henry I., on the occasion of his coronation, issued a charter, in which he promised freedom to the Church, and to do away with the evil practices by which the country had been oppressed; but almost all his promises are limited to the barons, the only reference to the people generally, being a promise to restore the law as it was in the time of Edward the Confessor.† This, however, was not a mere matter of form. Notwithstanding the proclamation of the conqueror sanctioning the ancient Anglo-Saxon system of self-government in the local courts, the Norman barons set them aside at their pleasure. A case of this kind in Worcestershire

\* MACAULAY, *Hist. Eng.* i. 7.

† Legem Edwardi regis vobis reddo cum illis emendationibus quibus pater meus eam emendavit consilio baronum suorum.

called forth a mandamus from Henry I., addressed to the Bishop of Worcester, who was a baron ex-officio, and to Urso de Abetot, hereditary sheriff, commanding that the county and hundred courts should be held as in the time of King Edward, and not otherwise; that all pleas between the barons holding in chief should be brought before the king's court; but that all others should be decided by the courts of the hundred and the shire, as in the time of Edward the Confessor.

In an extant compilation of the laws of Henry I., the local institutions are set out at large with curious minuteness; their popular nature will be a surprise to many, who have been accustomed to regard this period as one of despotic and arbitrary power. The *burgemot* and *sciremot* were to be held twice in the year; the folk-mote of the hundred or wapentake once every month; but all the free men were exhorted to attend twice in the year specially to see that the tythings or frank-pledges\* were properly filled up. These assemblies were to judge of all the pleas brought before them. The earl or baron of the district presided; but if neither he nor his deputy were present, the provost (*præpositus*), the priest, and four of the principal men of the locality acted in his stead. Each of the frank-pledges chose a chairman for itself. The chairman of the hundred was elected by popular voice, and called an alderman. The free men alone were eligible to vote in these courts; and although not clearly expressed, it is implied that the privilege was limited to those who were in the occupation of land.

The evils of the time did not arise out of the want of free institutions, but that these institutions were liable to be disregarded and overpowered by the action of arbitrary

\* These *decanies* or frank-pledges consisted of ten men each, bound together for mutual support, and responsible for the conduct of each member.

force, against which as yet no sufficient guarantee was provided.

After the death of Henry I., the country was torn to pieces by the civil wars between the Empress and King Stephen, and violence overspread the land; but out of this very evil arose the means of remedy. The power of the barons was greatly shaken, and many of their fiefs were confiscated. The crown had learned to seek the aid of the commons in its struggles with the haughty lords. Another element had been introduced into the body politic by the rise of the towns, which were hereafter to play so important a part. When Henry II. ascended the throne, the way was open for establishing the institutions of the country on a firmer basis, and of defining more clearly the mutual rights and obligations of each portion of the body politic.

In carrying out this design, he found a serious obstacle in the claims of the Church. The privileges which the priesthood had obtained from William I. of withdrawing all spiritual causes from the temporal courts, however useful and desirable it might have been in a time of lawless violence, had come to be a serious abuse. Grievous wrong was done, amounting to a denial of justice, by the claims of the priesthood to have every cause, however remotely connected with the sacerdotal order, withdrawn from the ordinary tribunals. This was stimulated still further by the disputes between the King and Archbishop Beckett respecting the investiture of the prelates, in which the Church claimed the privileges which had been expressly refused by William the Conqueror.

In the year 1164, a great council was held at Clarendon, in Wiltshire, under the presidency of the king, attended by the bishops and the greater barons (tenants in chief), in which the state of the country was seriously considered, and the measures adopted called the "Constitutions of Claren-

don," which are principally important as deciding from that time forward the limits of civil and ecclesiastical jurisdiction. All disputes respecting advowsons and presentations were to be decided in the king's courts. All clerics accused of any crime were to be amenable to the jurisdiction of the lay tribunals. No bishop or priest was to go out of the kingdom without permission of the king. No tenant in chief, nor any of the king's officers, was to be excommunicated, nor his lands laid under an interdict, without license from the king. If any dispute arose respecting property devoted to pious uses, the matter was to be decided by a jury of twelve laymen.\*

The prelates were to hold their possessions as tenants in chief under the crown, subject to all the obligations of the lay barons. No bishop was in future to be elected without the sanction and approval of the king.

These are the main provisions of a measure which may fairly be called the first landmark in our constitutional history, defining once for all the limits of clerical authority, and asserting the supremacy of the common law, to which all must be equally subject.

The Assize of Clarendon, which was held in 1166, lays down the future rules for the administration of the law, making it uniform throughout the kingdom, and providing for the holding of the various courts, both royal and local, at regular and suitable times. Many other wise and judicious measures were passed during this reign, into which it is impossible here to enter. I will mention one other, which is very important as indicating a rapid change in the military system of the country. This is the Assize of Arms, adopted in 1170. The feudal system was intended to provide for the defence of the country, but considerably less than the experience of a century had demonstrated its worthlessness.

\* This is the first distinct mention of trial by jury in any public document.



In place of the military service to which all the feudatories were bound, it had become common to pay a composition in money called a *scutage*, and this, in default of more regular contributions, the exchequer had been glad to accept, as it enabled the crown to hire mercenaries, who would probably be of more service in a military point of view. The feudal system had never legally superseded the original obligation on all holders of land to aid in military service; and it was now thought desirable to revert back to the original institution, to deprive the barons of their military influence, and to make all the levies directly responsible to the crown.

The Assize provided that every tenant of a knight's fee should provide a coat of mail, a helmet, shield, and lance, for every knight's fee in possession, if he was worth sixteen marks in personal property; those worth ten to sixteen marks to provide a breast plate and iron cap. All other burgesses and free men to provide a buff jerkin (*wambais*) and iron cap. No man was to sell or alienate his arms, or lend them, nor were they to be carried out of the country, except by order of the king. A sort of national Landwehr was thus provided, independent of the barons, and at the call of the crown in case of emergency.

The only retrogressive act of Henry II. was the Assize of the Forest, issued in 1184. The Norman kings were great hunters, and were thoroughly unscrupulous in their enclosure of forests, and protecting them by severe and stringent laws. The forest laws were very unpopular, both with the barons and the common people; but they were very tardily and reluctantly modified. Henry I. had distinctly refused any relaxation. Stephen, in his weakness, had been obliged partially to give way, but Henry II. re-enacted the exclusive jurisdiction, and imposed irritating precautions. Every male of the age of twelve years and upwards, in the neighbourhood of the forests, was to make oath that he

would not transgress the forest laws. All the posse comitatus of the shire was to be at the call of the king's foresters to put the laws in force. It required thirty-three years of further endurance before these forest laws were abrogated by Henry's grandson.

Another ordinance of Henry II. is worth recording, as being the first attempt to tax personal property. Up to this period, all national taxation had been fixed payments imposed on the land, either determined at the time of its original grant, or fixed by the great council of the nation. In 1188, it was determined to raise a fund to assist in the crusade against the Sultan Saladin, to obtain possession of the holy places. It is not stated on the face of the document, but it is fairly to be presumed, that the measure was sanctioned by the great council, though the bulk of the parties on whom the tax was levied had no voice in the matter. One-tenth part of the value of all moveable property was to be collected, with the exception of the arms and horses of the knights, and the horses, books, and vestments of the priests. The assessment was to be made in each parish, by parties appointed for the purpose; and if any one offered less than he was esteemed to be worth, a jury of four or six persons in the parish were to inquire and decide on the amount.

This ordinance is evidence of two facts: that it was not considered prudent or safe to attempt further taxation on the landholders, and that the personal property in the country had greatly increased. This increase had probably taken place principally in the towns, which were now rising into importance. Many charters were granted to towns in the reign of Henry II., which had brought prominently into notice their increasing wealth, and led doubtless to the perception of the tempting opportunity afforded for raising money.

There was not much during the short reign of Richard I.

bearing strongly on constitutional questions. From the terms of a commission issued to the judges, in 1194, to itinerate the country, it appears that, besides their judicial functions, they had multifarious business to transact; amongst other things, they were to follow up the new vein which had been discovered for raising money.

*"Praeterea tailleantur omnes civitates et burgi et dominae domini regis."*

"Further, contributions are to be levied on all cities and boroughs, and on the king's demesnes."

In this commission, the first mention is made of the office of coroner, which is elective, apparently by the landholders.

*"Praeterea in quolibet comitatu eligantur tres milites et unus clericus custodes placitorum coronae."*

"Further, in each county, let there be elected three knights and one cleric, who shall be custodians of the pleas of the crown."

The reign of John, disastrous and humiliating as it was in many respects, will always stand forth in English history as eminently distinguished by the concession of the great charter, the second great landmark in our constitutional history. I am not disposed to regard John as the imbecile character he is frequently represented. He was in many respects astute and able, and in no act did he display more sagacity than in the selection of the site of Liverpool for a port and borough, in which he displayed a foresight and discernment of a high order. He was, however, an unprincipled trickster, whom no engagements could bind, and who betrayed all who placed any confidence in him.

The circumstances which led to the granting of the great charter, and its general contents, are so well known as to preclude the necessity of here entering into any particulars; but it is as well distinctly to understand what the charter is,

and what it is not. It is not a constitution, in the sense of laying down the principles and method of government, and prescribing its mode of action. It is not a code of laws embracing the various relations between crown and subject, and between man and man. It is rather an acknowledgment of evils which had crept in and of wrongs perpetrated, and a promise that in future they should be amended. It does not so much lay down the law as take it for granted, and promise that in future it shall be observed. In this respect, as establishing the continuity of our institutions, it is invaluable. It lays down the axiom that Englishmen by custom and right are free; that the king is amenable to his subjects for breaches of these rights; and it implies that, in the absence of a legal remedy, oppression may be resisted by force. The promises of the king are not sustained by any provisions for protection by law such as exist in modern times, but every line manifests the deep sense of mutual responsibility between the king and the subject which has been never lost sight of in the laws of England. Let us glance at a few of the leading provisions.

The king promises that he will neither sell, nor deny, nor defer right and justice to any one.

No free man should be taken, or imprisoned, or deprived of his land, or outlawed, or exiled, or injured in any way, except by the lawful judgment of his peers or by the law of the land.

All merchants, traders, and all other persons were to have free access and egress to and from England, to buy and sell and to pursue their trade.

The arbitrary fines and heriots levied upon the estates of the tenants in chief on occasion of a decease and succession were to cease, and a money payment to be made not exceeding a hundred shillings for each knight's fee.

No tax in the form of scutage or aid was to be levied,

unless by the advice of the great council, except in certain specified cases.

The great council was to consist of the archbishops, bishops, abbots, earls, and the greater barons by writ. The lesser barons holding in chief were summoned in a body.

Every free man was to be protected in his rights, and not to be interfered with except by due course of law.

Immediately after the granting of the charter, letters patent were issued to the sheriffs of counties, requiring each to swear all within his district to observe the terms of the document, and that at the first meeting of the comitatus or folk-mote of the county, twelve knights should be elected, to inquire into and put down the evil customs which had grown up contrary to the tenor of the charter.

The thirteenth century was a period of rapid progress in English constitutional history. One very marked feature of the time was the growth of the towns, and the great number of charters granted for their incorporation, indicating a growing importance which could not long be deprived of its legitimate influence.

Before noticing the third great landmark in our constitutional progress, let me call attention to the changes which were taking place in our fiscal system. Under the feudal laws, no provision was made for the raising of a regular revenue. All land was subject to certain obligations, besides the military service in person or by deputy, but the money payments were small. The amount was eked out by scutages imposed in commutation of military service, by fines, heriots, wardships, payments to redeem the sovereign from captivity, or on occasion of the marriage of the king's eldest son or daughter. Aids also were levied, sometimes very arbitrarily. There were also the king's customs at the various ports, which were generally farmed out for a regular rental. But the revenue on the whole was not sufficient for the

growing wants of the crown. The attempt to tax personal property, first commenced by Henry II., in 1188, had been diligently followed up; and the increasing wealth of the towns encouraged this mode of raising a revenue. Notwithstanding the solemn compact of the great charter, King Henry III. resorted to the same forcible means for raising money which had been practised by his predecessors. Matthew Paris, under date of 1242, writes: "*Imminente vero purificatione beate Virginis, totius Angliæ nobilitas tam prælatorum quam comitum et baronum secundum regium præceptum est Londini congregatum. . . . Contradixerunt igitur regi in faciem nolentes amplius sic pecunia sua frustratorie spoliari.*"\*

Again, in the following year (1243), "*Cives Londinenses ad gravissimam compulsi sunt redemptionem quæ tallagium dicitur, sub hac forma; venerunt exactores et regales æditui ad illum vel illum civem, dicentes 'Tantam et tantam oportet te pecuniam domino regi in longinquis partibus pro commoditate regni, militante et nimis indigenti, donec in regno suo restauretur, commodare.'* Et secundum voluntatem et æstimationem extortorum, pecuniam civium mutilarunt."†

Henry III. issued three several confirmations of the great charter, in 1216, 1217 and 1225. These charters were evidently considered at the time mere personal guarantees of the monarch, not at all binding on his successors.

This growing want of money, and the impatience of

\* "On the eve of the Purification of the Blessed Virgin, the peerage of all England, both of prelates, earls and barons, were assembled by precept from the king at London. . . . They contradicted the king to his face, being unwilling to be despoiled of their property in such a needless manner."

† The citizens of London were compelled to a grievous contribution called 'tallage,' after this manner. The tax collectors and king's assessors came to this or that citizen, saying, 'It is necessary that thou shouldst accommodate the king, who is fighting in distant parts for the benefit of the kingdom, with such and such a sum, until he is restored to his own land;' and according to the will and pleasure of these extortioners, they mulct the citizens of their money at their own valuation.

the people under taxation, led by imperceptible degrees in the direction of the representative principle. In 1220, the king, being in grievous want of money, as he says, "through his great necessity, and the urgency of his creditors," the great council consented to a tax of two shillings on each plough, except those belonging to the bishops and the religious orders. The mode in which this was collected was new. By writ to the sheriff of each county, he was directed to call a folk-mote or assembly in the shire, when two knights were to be elected, who, with the sheriff, were to make the collection through the district.

In 1226 this principle of representation was carried further. Disputes had arisen between the sheriffs of several counties and the inhabitants, as to what class of property was assessable under the articles of the great charter. By request of the great council assembled at Winchester, the king issued writs to the sheriffs of several counties, that, for the purpose of determining this dispute, four legally qualified and discreet holders of knights' fees should be elected by the freeholders in each county, who should assemble at Lincoln for the purpose of exhibiting the grounds of complaint which they had concerning the articles in question. The document does not show to whom the power of decision was committed, but this is the first instance of delegation for the purpose of political discussion.

In 1254 an important advance was made. The king, being desperately in want of money and forces, issued a writ, addressed to the nobles and sheriffs of the kingdom, commanding, first, that all persons holding twenty "*libratas*" of land in chief, *i. e.*, under the crown, should muster at London, with horses and arms, to proceed to Portsmouth and embark for the continent; and, further, that the comitatus or folk-mote in each county should elect two knights to proceed to Westminster, to determine in their assembly

what aid they should give to the king in this pressing necessity.\* If this was not a House of Commons, it was certainly a very close approximation to it.

In 1258, the dissensions between the king and the barons ran very high. A great council, or parliament as it was now called, was held at Oxford. At this assembly the barons presented a long petition of the grievances they laboured under, and the reforms they desired. A council of twenty-four was elected, who drew up a series of articles called the "Provisions of Oxford," embodying the desired reforms, to which the king swore to conform. The mode of publication of these documents is worthy of note. Hitherto, all state papers had been written in Latin, but on this occasion the provisions were issued in Norman-French, as being the current language of the barons who compelled their adoption by the king. The royal consent was published both in Norman-French and in English; this being the first public document since the conquest ever issued in the English language. This bilingual proclamation leads to two conclusions, first, that at that time Norman-French was the ordinary language of the upper classes; and, second, that the English-speaking people had obtained sufficient importance to require being consulted and conciliated. When we remember that little more than a century after this, Chaucer had written his immortal works, and Wickliffe had translated the Bible into the English vernacular, we may form some idea of the marvellous progress of the nation in the thirteenth and fourteenth centuries.

Under the Provisions of Oxford, a council of twenty-four barons was elected, who, in fact, controlled for a time the entire government. In regard to the parliament, the council determined that it should assemble three times each year; to consist of fifteen barons, elected in manner therein pro-

\* "*quale auxilium nobis in tanta necessitate impendere voluerint.*"



vided; and that "the commonalty should elect twelve honest men, who shall come at the parliaments, and other times when occasion shall be, when the king or his council shall send for them, to treat of the wants of the king and of the kingdom. And that the commonalty shall hold as established that which these twelve shall do. And that shall be done to spare the cost of the commonalty."\*

These arrangements soon fell through. The barons quarrelled amongst themselves, part taking side with the king. After a vain attempt at arbitration by St. Louis of France, both sides flew to arms; and at the battle of Lewes, in 1264, the king and prince Edward were taken prisoners, and the reins of government fell into the hands of the celebrated Simon de Montfort, Earl of Leicester.

In June 1264, De Montfort, acting in the name of the king, summoned a parliament, to meet at London on the feast of the Holy Trinity. In addition to the prelates and magnates, writs were issued for the election of four knights from each shire; but no notice whatever is taken of the boroughs.

This parliament sat for a short time, and assisted in forming a scheme of government.

In prospect of an invasion from France in aid of the captive monarch, in December 1264, De Montfort summoned the celebrated parliament of 1265, which consisted of barons, ecclesiastics, two knights from each shire, and two burgesses from each borough to which writs were issued. The towns had now obtained considerable power in the state, and contributed largely to the national treasury. The representation of the counties had existed for some time, and it appeared but a slight extension of the same principle to invite the

\* "Si fet a remembre ke le commun esliue xii. prodes homes, ke vendrunt as parlemenz et autre fez quant mester serra, quant le rei u sun conseil les mandera pur treter des bosoignes le rei et del reaume. E ke le commun tendra pur estable ceo ke ces xii. frunt. E ceo serra fet pur esparnier le cust del commun."

burgesses of the towns to take part in devising provision for the ways and means. We have no information from the documents whether this parliament formed a single chamber, or separated from the first into two. In this quiet and unostentatious way, sprang into being an assembly which has gone on increasing in influence from age to age, until it has become supreme in the state, absorbing to itself the ultimate decision as expressing the will of the nation; which has changed dynasties, and inflicted capital punishment both on kings and ministers, and whose power is only limited by the will of the nation. Well may we look upon this as one of the great landmarks—the third in my category in point of time—of our constitutional history. Henceforward the House of Commons became an integral element of our system of government, and no further reference to it is necessary.\*

Edward I. was one of the noblest monarchs who ever occupied the throne of England; wise, bold, sagacious and prudent, he had all the qualifications requisite for the work of the age, in concentrating, organising and defining the floating elements of English law, and the mutual rights and obligations of all classes, the principles of which had been acknowledged over and over again in the various royal charters, but which, for want of tangible guarantees, were liable to be abused and set at nought.

The next landmark to which I call attention is the Statute of Mortmain, 7th Edward I. (1279.) By the Con-

\* The following extract from the writ of summons, containing the portion relating to the knights of the shire and the burgesses, may be interesting:—

"Item mandatum est singulis vicecomitibus per Angliam quod venire faciant duos milites de legalioribus, probioribus, et discretioribus militibus singulorum comitatum ad regem Londoniis in octavis predictis in forma supradicta.

"Item in forma predicta scribitur civibus Eboraci, civibus Lincolnis, et ceteris burgis Angliæ quod mittant in forma predicta duos de discretionibus, legalioribus et probioribus tam civibus quam burgensibus.

"Item in forma predicta mandatum est baronibus et probis hominibus Quinque Portuum."

stitutions of Clarendon (1164), the ecclesiastical jurisdiction was made subordinate to the civil; but the acquisition of lands by the religious orders continued in an increasing ratio, and threatened seriously to impede the provisions for military service, and for the defence of the kingdom. The term mortmain, or dead hand, arose in this way. Under the feudal system, at any change of tenure of lands held in fee, the superior lord, whether the king or one of the great barons, was entitled to certain payments; and under various pretexts other levies were made, as escheats, reliefs, wards, marriages, &c. The holders of knights' fees were also liable to military service. When lands were made over to a corporation with perpetual succession, these incidents never occurred, and the crown or lord was deprived of his perquisites or dues. The land was therefore said to be held "in mortua manu," since a dead hand yields no service. This privilege was fraudulently taken advantage of by lay owners of lands, who bestowed their estates on the religious foundations, with the understanding that they should receive them back as fiefs of the church, and thus evade their civil and military obligations. This had grown to such a height as to demand prompt repression. Hence the statute "De Viris Religiosis," passed at Westminster, in November 1279. The preamble states, that "Whereas of late it was provided that ecclesiastics should not enter upon any lands in fee, without the licence and consent of the superior lords of whom such lands are immediately held; and whereas, nevertheless, ecclesiastics have entered into fees of their own as well as those of others, by appropriating them to their own use, sometimes buying and sometimes receiving them as donations, whereby the services which were due from such fees, and were originally intended for the defence of the kingdom, have been withdrawn," &c., it is therefore enacted, "that no ecclesiastic or other person shall buy or sell any

lands or tenements, or, under colour of donation or lease or any other title whatever, shall presume so to appropriate them as that they shall become tenures in mortmain, under pain of forfeiture." It is also provided, that in case of violation of the law the superior lord may enter and take possession of the lands within a year; if he neglect, the next lord may enter within the succeeding six months; and if all neglect, the land is to be forfeited to the crown."

The principle here set forth has been expanded and further defined by subsequent legislation, but all tending to the same end; prohibiting the abstraction of landed property from the public duties and obligations to which it is primarily subject; and discouraging the permanent appropriation of lands to pious and charitable uses, without due protection from the abuses to which such appropriation is liable. This, then, I consider the fourth landmark in our constitutional progress.

I have already called attention to the efforts made by Henry II. towards counteracting the insubordinate tendency of the feudal system, in making the military array directly responsible to the government, and to the subsequent attempts in the same direction, by extending the incidence of taxation and the representation of the trading classes.

The practice had commenced in the time of Henry II., when lands escheated to the crown by forfeiture or any other cause, of regranting them in tenure of common socage, that is, subject to a fixed payment or service direct to the crown. The same took place in regard to burgage tenures in chartered towns. Following up the course pursued by his ancestors, Edward I. passed several measures calculated still further to weaken the feudal system, and to make all services directly responsible to the crown. In 1278, commenced the issue of writs to the sheriffs of the counties, commanding that all persons holding lands in socage, of the value of £20

per annum, should take up their knighthood, have their names inscribed on the roll, and provide themselves with suitable arms and armour.

This injunction worked in two ways. If it was literally obeyed, the military force, at the direct command of the the crown, was enlarged and strengthened. If the parties were not disposed to take up arms, a revenue was raised by compounding for a money payment, "pro respectu militiæ," for respite of knighthood.

In 1285 an act was passed, called the Statute of Westminster, which, in making provision for the peace and good government of the country, revived many of the old institutions which had been partially in abeyance during the prevalence of the feudal system, and which, in their recapitulation, have much in common with the ancient Anglo-Saxon laws. A system of local self-government is clearly recognised and laid down. Every man is commanded to keep in his house "harness for to keep the peace after the ancient assize," of which minute particulars are given.\*

In the early days of chivalry, the system of infeudation was a graduation of service—the great lords owing homage and allegiance to the king, the lesser lords to the greater ones, and so down to the knights and men-at-arms. In process of time, a practice grew up of sub-infeudation, under which vassals sold their fiefs, retaining the superiority to themselves, and in this way depriving the superior lord and the crown of the escheats, wardships, marriages, heriots and other dues. Manors were in this way created within manors, and military service avoided. To remedy this, was passed,

\* The original is in Norman-French, of which this is a specimen. "Qe chescun home eit en sa mesun armure pur la pees garder, solum la aunciene assise; ceo est asaver qe chescun home entre quinze annz e seisaunte soit assis e jure as armes, solum la quantite do lur terres e de lur chatens; ceo est assaver, a quinze, liverce des terres e chatens de quarante mars, halibergeun, chapel de feer, espe, cutel e cheval," &c.

in 1290, the statute, called from the first two words, "Quia Emptores," which forbade in future the practice of creating subordinate fiefs, or additional manors. The effect of this law was not so much immediate as prospective. It put a stop to the further extension of the feudal tenures, and tended gradually to convert the holders of subordinate fiefs into the simple copy-holders of modern times.

Although this enactment is not of so prominent a character as some of the others cited, yet its ultimate results were so beneficial in simplifying the tenure of land, and strengthening the principle of common responsibility to the central government, that I venture to give it a place as the fifth landmark in the constitutional survey we are now making.

The next enactment to which I shall call attention is one of much greater fame. This is the celebrated statute, "De Tallagio non concedendo," a measure which, in the minds of many, lies at the root of the English constitution, and undoubtedly is the foundation of the supreme controlling power possessed by the House of Commons. It may be worth while to go a little into detail as to the circumstances which led to the passing of this important measure.

The "Tallagium," French *taille*, seems to have been originally an impost levied in kind upon the product of the demesne lands of the king or lord, in the hands of tenants not subject to feudal service. It was an arbitrary levy at the will of the superior, and became gradually commuted into a money payment.

From the time when the first impost was laid upon chattels, or personal property, by Henry II., by the ordinance of the Saladin tithe in 1188, the tax on moveables gradually took the name of *tallagium* or *taillage*.\* From

\* Thus in 1220 we read—"Rex Anglie in dies Pentecostes accepit etiam *tailagium* per angliam de singulis carucis duos solidos."—ANN. WAVERLOV.

In 1255—"Disposuit rex habere *taylagium* quod dicitur *Horngeth*."—ANN. BURTON.

the first this had always been accompanied by a sort of representation. Delegates or jurors were appointed in each parish to determine every man's liability, and to assess his proportion of the impost. At the time of the granting of Magna Carta, this system of taxation was in its infancy. In 1207, King John, with the consent of the great council, had levied an income tax of 12d. in every mark; but from the terms of the writ, this appears to have been confined to the feudal tenures. In the great charter, it is provided that no "scutage" or "aid" should be levied without the consent of the great council except under certain specified circumstances. Nothing is said about *taillage*, or imposts on chattels, which we may fairly infer would have been the case had such been an ordinary mode of raising money at the time.

In the third confirmation of Magna Carta by Henry III., A. D. 1225, a new article is introduced, "that in return for the concession of these liberties, and of others, granted in the forest charter (issued in 1217), the archbishops, bishops, abbots, priors, earls, barons, knights, freeholders, and all others in our kingdom, have granted to us the fifteenth of all their moveables." Although the commons are introduced as consenting parties, it does not appear that they were consulted. They were certainly not summoned to the council or parliament. This tax, which was in the nature of a *taillage*, was collected by the reeve and four men in each township; disputes were to be settled by juries, and four elected knights in each hundred were to receive the money and pay it over.

From this time, the tax on moveables became a common means of supply. Usually the great council were asked their consent, which, on one occasion, A. D. 1242, they absolutely refused. The growing wealth of the towns rendered them a profitable source of revenue, and as we have seen ulti-

mately led to their representatives being summoned, in 1264, as a component part of the parliament.

Eight years after this, in 1272, Edward I. ascended the throne. Sagacious as he was, he did not all at once adapt himself to the new state of things arising out of the introduction of the representative system. The wars in which he was continually engaged led to financial difficulties, and every possible expedient was resorted to for the purpose of raising money. Sometimes his officers negotiated with the landowners and burgesses in the provinces. At others he applied for and obtained parliamentary sanction for his exactions. These parliaments sometimes embraced only the barons and clergy. At others the commons came together without the clergy.

In November 1296, the king summoned a parliament, which met at Bury St. Edmunds. The barons and knights of the shire who met together, granted a subsidy of one-twelfth on moveables, and the commons one of an eighth. The clergy were more refractory, and, acting on the strength of a bull of Pope Boniface VIII., just issued, which prohibited the payment by the clergy to the state of any tax on the revenues of the churches, they refused to grant the king any aid. The king met this refusal by an outlawry of the whole body, and by a temporary confiscation of the estates of the see of Canterbury.

On the 24th February, 1297, the baronage alone was called together by royal writ at Salisbury. Here the king unfolded his plans to the barons. He proposed himself to go to Flanders, to carry on the war in person, and requested the barons to undertake an expedition to Gascony, under his brother Edmund Crouchback, Earl of Lancaster. This was met by a flat refusal. The barons would undertake no service abroad, but in attendance on the sovereign. The assembly broke up in confusion, and the earls retired to



their castles to make preparations to resist the king. Edward then, growing desperate, laid violent hands on the wool of the merchants intended for exportation, which he paid for by exchequer tallies, and enforced contributions of provisions in the same way.

All parties were now united in hostility to the arbitrary exactions of the crown. The king, however, refused to draw back; and on the 15th May, he issued writs for assembling all the military array of the kingdom, to include the attendance in arms of all persons holding lands of the value of £20 per annum. On the 7th July, the forces met in array. The majority of the barons were still recalcitrant, but, with the consent of the few barons and commons who still adhered to him, the king proceeded to levy a tax on the nation at large. The clergy were more tractable, and the king wrung from them a reluctant consent to the granting of a subsidy.

The earls now presented a statement of grievances, demanding relief from the taxation imposed without consent of Parliament, the confirmation of the charters, and the abolition of a new tax imposed on wool. The king, however, departed for the continent, leaving affairs in a very unsettled state. After his departure, the earls appeared in force, and forbade the collection of the aid until the promised confirmation of the charters had taken place. The time was critical, but the king saw the danger, and met it with candour and prudence. Prince Edward, who had been left regent, issued writs for a new Parliament, promising to confirm the charters, and make further concessions, in consideration of the grant of an aid of one-eighth. The earls appeared with a large military force, and prescribed the terms which they required supplementary to the charter. The prince accepted these terms, which were dispatched to his father in Flanders, and confirmed by him.

Disputes afterwards arose, which were not finally disposed of until 1801, when they were finally set at rest.

This is in brief the history of the celebrated enactment "De Tallagio non Concedendo," which first laid down the principle, now an axiom in the British constitution, that no tax shall be levied without the consent of the people by their representatives in Parliament assembled. The principal clauses are as follows:—

"Nullum tallagium vel auxilium per nos vel hæredes nostros de cetero in regno nostro imponatur seu levetur, sine voluntate et assensu communi archiepiscoporum, episcoporum, et aliorum prælatorum, comitum, baronum, militum, burgensium, et aliorum liberorum hominum in regno nostro.

"Nullus minister noster vel hæredum nostrorum capiat blada, lanas, coria, aut aliquæ bona cujuscunque, sine voluntate et assensu illius cujus fuerint hujusmodi bona."\*

Until very recently this document was always considered as a statute, and is so quoted in the preamble to the Petition of Right presented to the House of Commons in 1626. More recent investigations have established the fact that this was not a *statute* at all; that the original was in Norman-French, and is simply an act of the king confirmatory of the previous charters, and that it was not quite so decisive as had been supposed.

The Latin version is given by Walter of Hemingburgh in his chronicle as the translation of the original document, but is by no means a faithful one. The original has a saving clause, reserving to the king "the ancient aids and prises due and accustomed."

\* "No talliage or aid shall be imposed or levied, either by us or our heirs within our kingdom, without the consent and assent of the archbishops, bishops, and other prelates, and of the earls, barons, knights, burgesses, and other free men in our kingdom.

"No officer of ours, or of our heirs, shall take any grain, wool, leather, or any other goods, of any person whomsoever, without the will and consent of him to whom the goods belong."

The principle here laid down has been embodied, as one of the fundamentals of the British constitution, in the Bill of Rights accepted by William and Mary, on their election to the crown of England in 1689, in the following terms:—

“ That levying of money for or to the use of the crown by pretence of prerogative without grant of Parliament, or for longer time, or in other manner than the same is or shall be granted, is illegal.”

At this point in our history I pause. Let me briefly recapitulate the several landmarks to which I have called attention.

The first, the Constitutions of Clarendon, enacted in 1164, annulled the independent jurisdiction of the Church courts, and subjected both clergy and laity to the common law of the land.

The second, the Great Charter of Liberties, granted in 1216, established the rights of the people as against the crown, and laid down principles which have never since been lost sight of.

The third, the creation of the Commons House of Parliament in 1264, gave the key note to all future legislation as ultimately proceeding from the people.

The fourth, the statute of Mortmain, passed in 1279, established the principle that all property, cleric or laic, should be equally liable to the defence of the kingdom.

The fifth, the statute “*Quia Emptores*,” in 1290, laid the axe to the root of the feudal system, and by degrees brought all lands in direct relation to the central authority.

The sixth, “*De Tallagio non Concedendo*,” admitted to the fullest extent, that taxation and representation must go hand-in-hand, and that the duties of crown and people are mutual and reciprocal.

Thus the close of the thirteenth century witnessed the

establishment of the English Constitution on a firm and solid basis. The work of the succeeding centuries added no new principles. The great remaining defect, which it took many ages to remedy, was the providing suitable machinery for the working of the principles so laid down. In the stormy periods of the fourteenth and fifteenth centuries, they were borne down at times by the sheer violence of contending parties. The Tudors, in the sixteenth century, strictly maintained the constitutional forms, and on the whole carried out the wishes of the nation, though they ever found the parliaments the ready instruments of persecution and cruelty to individuals.

In the seventeenth century, the principles I have endeavoured to expound were in collision with arbitrary power during the whole duration of the unfortunate Stuart dynasty; but ultimately they finally triumphed, and have never since been called in question.

The only modern act which can be compared in importance with those I have cited is the Habeas Corpus Act (31st Chas. II., ch. 2), by which personal liberty is fully secured. The sacredness of human life is exhibited in the ancient institution of the Coroners' Inquest, which allows no case of suspicious decease to be passed over without inquiry.

The liability of official persons for their official acts, and the freedom of the press and freedom of speech, are rather secured by the absence of any law to the contrary, than by any specific legislation.

The English Constitution is a glorious inheritance, of which we may well be proud. Its leading principle is the essence of all liberty—"the not being restrained by any law which does not contribute in a greater degree to the public welfare." The English polity may be compared to a vast machine, of which the energy of the people is the moving

power; the law, the channel in which its forces act; and public opinion, as expressed by a free press, the regulating guide.

We know not what is in the womb of time, and what changes may be in store; but we know that a nation which only desires just laws, equal rights, and the welfare of the people, has nothing to fear.

Her open eyes desire the truth.

The wisdom of a thousand years

Is in them. May perpetual youth

Keep dry their light from tears.

That her fair form may stand and shine,

Make bright our days and light our dreams;

Turning to scorn, with lips divine,

The falsehood of extremes.

## THE FORTUNES OF A FLEMISH MYSTIC.

By ALEXANDER GORDON, M.A.

Happening some years ago to be interested in the ordination of a college friend, who was about to reach the dignity of a presbyter in the established kirk of Scotland, the writer of this paper took the opportunity of being present on the solemn occasion, on which, in answer to question duly put, the candidate for orders formally renounces "all Popish, Arian, Socinian, Bourignian, and other doctrines, texts and opinions, contrary to the Confession of Faith." So, after the ceremony was concluded, the irresistible impulse of an inquiring mind made the writer step up to the newly ordained, and, amid fitting congratulations, propound this humble query, "I wish you would answer me one question more. Arian and Socinian errors, I know, are enough to ruin any man's soul, without benefit of good works; but what are those dreadful Bourignian doctrines and tenets, of which you have just been washing your hands so carefully?" Truth compels one with sorrow to add that the young divine addressed, could not or would not, satisfy the questioner. The only thing that could be got out of him was, that the errors in question were the opinions of one Madam Bourignon; and that he supposed they might be taken as pretty nearly synonymous with "profane and old wives' fables."

2. In this same state of unsatisfied ignorance the present writer remained, not thinking much more of the matter, till, one afternoon early in 1868, while rummaging the contents of an ancient dingy book-stall in Liverpool, there chanced to come to hand a tattered, ill conditioned

volume, which described itself upon the title page as *The Light of the World ; being a continuation of the Conferences which Antonia Bourignon had with the deceased Mr. Christian De Cort ; which deserves to be read, understood, and considered by all who desire to be saved.* The outlay of a sixpence transferred this treasure from the stall to the writer's pocket.

3. It must be confessed that the heading of the title of this dilapidated octavo did not at first sight inspire the purchaser with nearly so much curiosity as did the publisher's name at the foot. It was that of Robert Hindmarsh, the Clerkenwell printer who became in 1787 the virtual founder, and in 1788 the acknowledged High Priest of the New Jerusalem (or Swedenborgian) Church. In 1786, when this book issued from his press, Hindmarsh was a young man of seven and twenty, who had been for four years a diligent student of the *Arcana Cœlestia*, and other works by the same master, to promote the circulation of which he had in 1784 established the Theosophical Society. These particulars had all been newly brought out by the publication in 1867 of William White's *Emanuel Swedenborg : His Life and Writings*, with the wonderful and grotesque narrative of the Swedenborgian annals, contained in Chapter thirty-six of Part II.

4. It was natural, therefore, to turn over with some interest Hindmarsh's Address "to the unprejudiced reader, of whatsoever party or persuasion," prefixed to *The Light of the World*, and especially that part of it which deals with "the unworthy publisher's peculiar call to his reprinting the same." Here one might hope to glean some additional information respecting the early religious history of that "bold builder of Jerusalem," as he has been called. Nor was the search altogether disappointing. The intermediate condition of experience through which a youth of enthusiasm,

and of visionary aptitudes, coupled with a strongly realistic turn of mind, could be led out of Methodism into Swedenborgianism, or "the New-rising Church," was very curiously illustrated in the Address referred to, and its appended letters.

5. Hindmarsh's account of the manner in which the book came to his notice is characteristic. He evidently half believes that it was put into his way by a miracle. "About five years ago," he says, "I heard of this book, viz., *The Light of the World*, and that it was written by a young lady both of family and fortune. I was much struck both with the title of the book and the account of the author, it being so rare a thing for young ladies of family and fortune to publish books upon divine and eternal subjects." He moralises upon the title, after which he thus proceeds. "Hereupon I sought for it in many places, but to no purpose, till the most merciful Lord was pleased to move a stranger to send it me by the waggon from a neighbouring county." As soon as he had read the book, which he acquired no doubt in the English edition of 1696, he "conceived a desire of reprinting it;" indeed the Lord "condescended to move" him thereto, but the poor printer had not the wherewithal.

6. How he obtained the requisite means he shall say in his own words. "Soon after I saw it my duty to publish this *Light of the World*, I received a letter from a certain preacher, accusing me of lending hurtful books to the simple and ignorant, amongst which he mentioned Baron Swedenborg's, John Engelbrecht's, and Madam Bourignon's." To this letter Hindmarsh returned a lengthy reply, which he not unreasonably concluded by saying that he "had only to wish that those who could not join with" him "in the great truths discoverable in their writings, would allow" him "and others a like share of liberty in judging of religious



matters as they themselves laid claim to." Then comes the pith of the story. "About two hours after I had sent my letter to the post-office, the postman brought me a letter, which was from a lady who lived more than a hundred and twenty miles off, and which person I had very little acquaintance with, having only seen her two or three times in my travelling, and of whom I had heard nothing for more than three years. The purport of the letter was this, to advise with me about republishing *The Light of the World*, offering £50 towards printing it for the benefit of mankind. Upon reading her letter, tears of love and gratitude filled both my eyes and my heart, &c. I then gave the lady for answer, that her letter had convinced me I was acting in the will of God, being at that time preparing the very book for the press; and that, with respect to giving the £50 she proposed, she must do as the Lord directed her; telling her, at the same time, that if she did, I should consider it as the Lord's money, to be employed for the benefit of mankind, declaring that I did not publish books from any pecuniary motives, but only for the service of my fellow creatures."<sup>1</sup>

7. So much for Hindmarsh's preface. The book as he prints it is an abridgment of the original work, but an abridgment very carefully and judiciously made. Turning to it for further examination, a poorly executed engraving of the authoress meets the eye, facing the title page. It represents a woman no longer young, and certainly not beautiful, with much firmness indicated in the thin resolute lips, and a great deal of tenderness and spirituality looking out from the not large or lustrous, but deep, beseeching eyes; the habit is something between the fashion of a Nun and of a Quakeress; the pinched cheeks convey the notion of an ascetic, and one in ill health. It may be interesting to know something of the plaintive story of this gentle mystic,

<sup>1</sup> *Light of the World*, edition of 1786, pp. 44-48.

whose teaching, repelled by the Kirk, was attractive to the disciple of the Swedish seer.

8. A slight sketch of the life of this lady is given in the Address to the Reader, but this is only a meagre and imperfect account. Fuller materials for forming an estimate of her career, both in its outward and its inward aspects, are to be found collected in a volume published at Amsterdam in 1683, with the title *La Vie de Dam<sup>me</sup> Antoinette Bourignon*; and these materials have been skilfully arranged and condensed to form the fourth part of the English *Apology for M. Antonia Bourignon*, published at London in 1699.

9. The materials referred to are threefold. In 1663, while living at Malines, Mdle. Bourignon wrote an account of her interior life up to that date, under the title of *La Parole de Dieu*. In 1668, at Amsterdam, she wrote a narrative of her outward life, *La Vie Extérieure*, &c., bringing it down to the year 1661. This was supplemented after her death, *La Vie Continué*, &c., by her friend and disciple, Pierre Poiret; and the three narratives, preceded by an elaborate *Préface Apologétique*, were by him published anonymously as above, in 1683. From a comparison of these sources the following sketch of her life is obtained.

10. In the good old cloth-working town of Lille, anciently L'Isle, or Ryssel, if we prefer the name in its Flemish form, reckoned to be in the Spanish Netherlands, before the ambition of Louis XIV. had transferred it to France at the treaty of Aix-la-Chapelle (1668), there lived at the beginning of the seventeenth century, one Jean Bourignon. He came from Italy, where he was born about 1580, and his name has probably suffered by being shorn of its euphonious termination. It may originally have been something like Giovanni Borignoni. He seems to have been a thriving man of business, but thoroughly illiterate, and

never learned so much as to be able to write. In 1610, being then about thirty years of age, he married Marguerite Becquart, a Flemish girl of some property, from the neighbourhood of Lille. Four daughters were born to the couple, and one son, but of this family of five, only two lived to grow up; the eldest and the third, both daughters. It is the third daughter in whom we are most interested. She was born on the 18th January, 1616, and baptised in the Church of St. Maurice, by the name of Anthoinette.

11. The poor child came into the world so miserably disfigured that her mother could not bear to look upon her, and thought she had given birth to a monster. It is even said they thought at first of smothering the hapless babe. Her forehead to the eyes was thickly studded with black hair; her upper lip was joined on to the nose, so that the mouth was fastened open in a horrible manner.<sup>2</sup> For six weeks they allowed no one to look upon the little deformity, but a skilful surgeon having severed the connection between the nose and the lip, and the hair having of itself begun to fall off, the infant became presentable, and in process of time acquired something like good looks. Unfortunately, however, the mother, though a religious woman, never got over her first aversion to the child, but slighted her and treated her with harshness, even from her earliest years; and by her example encouraged the other children to do the same. The father, we are told, loved her best of them all, but he was rarely at home except at meal-times, and hence the little one had much to bear. Vexing ways and ungentle usage drove her completely into herself, and made her retreat from the rude games of the rest, to the silent company of her single doll.

<sup>2</sup> Poirer spiritualises upon this malformation in execrable taste. Not only was the unsightly hair a divine gift, like the locks of Samson, but the grinning mouth was "le présage d'une personne qui devrait dire un jour la vérité à bouche ouverte."

12. A joyless childhood is a sad preparation for the struggles and trials of life. The early neglect and scornful treatment to which Anthoinette was subjected at home dropped into her cup a bitterness of taste which remained. It seemed from the very first a natural thing for her to be hunted about, derided and misunderstood ; this of itself, and apart from her other misfortunes, gave a plaintive, persecuted, much-enduring, almost martyr-like tone to her relations in after life with the wider circle of the world. Had it not been that religious impressions took a very strong hold of her childish mind, her opening life would have been still more void of comfort and solace. With a pardonable scepticism she doubted, on hearing of Christian precepts and principles, whether she was living amongst those who practised them ; and one day, before she was five years old, she surprised her parents by gravely inquiring if she might go and live in the country where the Christians dwelt. They only laughed at her, but she did not cease to put the question to others, " Where is the land of the Christians ? " explaining, with a childish literalness, " I see here good houses, fine furniture, and silver in plenty ; but Jesus was born in a stable and lived in poverty. How, then, can we be the true Christians whom Jesus Christ has taught ? " Still laughed at by those about her, she wisely held her tongue, and buried in her own heart the cherished intention of finding out a road some day which would take her into the Land of Christians.

13. In other ways besides that of directly harsh and unsympathetic treatment, the home was an unfortunate one for a sensitive child. The father and mother frequently quarrelled, and the little Anthoinette, after acting the part of peacemaker by appeasing her father as well as she could with her childish caresses, would retire apart when the storm was over, and, trembling with the shock and excitement of the troubles of the household, would say, " My God, my God,

grant that I may never marry!" Thus she carried with her, as the legacy of her childhood, an unsatisfied longing for an ideal state of Christian simplicity, and a fixed resolve to dedicate herself to a virgin life.

14. When she had reached the age of nine, her father took her on his horse beside him, and rode with her to Ypres (Yperen) where he left her for some months, that she might learn Flemish. For half a year she was boarded with the widow Van Arrinch, who loved her and looked after her like a mother; but the good widow died, and her neighbour, Mme. Van Albos, who undertook the charge for four months more, was neither so kind nor so careful of her. The child was allowed to run about the streets, and her meals were grudged to her, though a large sum was paid for her board. An illness which attacked her, gave the alarm to her father, who at once removed her back to Lille. In after life she blamed herself severely for the carelessness of some of her earlier years, accusing herself especially of two faults, negligence and prodigality: "From my infancy," she writes in 1676, "I was so careless that I lost my books in the school, my aprons, my shoes, and all things that were not sewed or strongly tied, for which my mother was often angry with me, and chastised me, without being able to make me amend. I was likewise so liberal that I gave all the meat and fruit which was brought me to the school unto poor children, and loved rather to suffer hunger than to refuse anything to them that asked it of me. And when I was come to the age of understanding I continued thus, yea, exceeded in this liberality, which, if it had been a virtue, I would have excelled therein more than any person I ever knew. For I not only gave that whereof I had abundance, but also that which I had need of myself. For, being as yet young in my father's house, I used not to eat the delicate meat which was sometimes served up there, but kept

it, together with the wine, to carry them to poor sick persons, to whom I even carried the clean linen off my bed." <sup>2</sup> Even this extravagance of giving betrays rather a lack of judgment than a fault of disposition in a young person, but, as life went on, Mdle. Bourignon learned to show no mercy to the slightest symptom of carelessness, however good-natured it might appear.

15. As she grew towards womanhood she and her eldest sister, the only survivors of the family of five, were much more thrown together, and for a time she went into society, and took part in its gaieties. Her sister was fond of dress and company, but this example had not so much influence with her as the wish of her father, who denied her nothing that could contribute to her appearing in the world to advantage. Added to this, as often happens with girls originally plain, she had her period of good looks, and could not but be flattered with the attentions which were paid her.

16. This innocent resort to the pleasures of society did not last long, nor did its effects sink very deep. She was strongly impressed with a feeling of the hollowness of the life around her. Had she found any one who could draw forth her affections it might have been otherwise, but, growing up without a soul really to love or to care for her, petted but not understood by her father, snubbed by her mother and sister, she soon sank back into a religious melancholy. In the midst of a dance she would have a vivid apprehension of hell. She composed deeply solemn words to go to the gay tunes which she had learned to play on her spinet, and cried over them till the keyboard was wet with her tears. Her favourite walk became the churchyard; she forced herself, against the grain of a natural reluctance, to enter the charnel house, and pick up the bones of the dead, repeating to herself with a shudder, as she did so, "See

<sup>2</sup> *Treatise of Solid Vertue*, English Edition, 1699, part ii., pp. 161-162.

what you are! This, or something yet more frightful, is what you will soon be!"<sup>4</sup>

17. After her sister's marriage she kept herself very much retired from company, stayed alone in her room, and entered on a very austere life, sleeping little upon a hard bed or nothing but a bare plank, fasting much, and putting ashes into her food to punish her palate, for seven years together wearing secretly a rough garment of haircloth next her skin, without ever changing it, although its harshness and the vermin which it harboured made scars on her arms, which remained, like the marks of some terrible burn, to the end of her life. At this period too she was much given to prayer, remaining on her knees the greater part of the night, till sleep overtook her, and she fell bruising her face upon the boards of the floor; withal constantly attending church and sacraments, and employing herself in sedulously visiting the poor and sick. By these means, she, for a season, regained, amid her austerities, a most cheerful and contented mind.

18. Asceticism of this severe type began with her nineteenth year, and lasted till she was five and twenty. Its beginning in 1634 was signalised on this wise. One night she heard a sound, speaking in the stillness of her own heart, which woke the inmost echoes of her soul. It was the voice of God, which bade her "Quit all the things of earth. Separate thyself from the love of every creature. Deny thyself." Voices of equal solemnity, and testifying to a divine guidance immediately present to order her conduct and direct her course, continued to make themselves heard throughout her whole after-life. They formed the distinctive feature of her spiritual experience. Her great characteristic henceforth, as a religious woman, lay in her frequent consultation of the heavenly will, with an unreserved free-

<sup>4</sup> *Vie Continue*, p. 38.

dom and confidence of appeal; her supreme consolation in every strait was founded on the ready response which came in divine utterances distinctly audible to the heart; her one object and aim was to obey with the utmost exactness the divine mandate, the *Parole de Dieu*, which came home to her as the decree of an infallible oracle. It is scarcely possible to turn a single page of her history from this point and not encounter the record of some pregnant sentence, presumedly a dictum of the Divine mind, which supplied the principle on which she acted. It is not our purpose to refer to these communications in detail; this general notice of them may be sufficient. But it should be borne in mind that the materials from which the present account is drawn teem with these indications of a special illumination and guidance.

19. The circumstance of so solemn a call to a renunciation of all creaturely loves and joys impelled the young Anthoinette to seek a retirement from the world more complete and systematic than the occasional seclusion of her chamber. Accordingly she begged her father to allow her to enter a convent. She had already made her choice among religious houses, and set her heart upon joining a Carmelite cloister, on account of the closer solitude and greater austerity of that order of nuns. Jean Bourignon absolutely refused to permit his daughter to take any such step, saying, in his brusque fashion, "She should go to no Carmelites. He had rather see both her legs broken. She had better be bedridden for life; nay, laid at once in her grave." This adverse decision appeared to her ardent mind an unreasonable cruelty, for she fully expected to find under the shadow of the cloister the true Christians whose abode she had so long been seeking. She discovered, however, that her father knew these places better than she; for on his declining to pay for her entrance into one of them, she went



straight to her spiritual adviser, Père Laurens, Prior of the Barefooted Carmelites, to whom she had been in the habit of confessing twice a week, and offered to become a servant in the convent of which he was the director, and promised to work hard for her bread, and be content with little, if he would only secure her free admission. The good Father smiled, and said, "That cannot be. We are short of funds for building purposes. We don't care to take any young ladies without payment. You must find money, or you will not get in."

20. This rebuff, while it quickly undeceived her as to her fond hopes of a primitive simplicity and unworldliness to be found within convent walls, did not in any way contribute to make her more reconciled with the order of things outside. Her room became her cloister and her church. She had lost confidence in her Confessor. "I had no one" she says, "to whom I could reveal my conflicts. That was why I constantly addressed myself to God." On a little altar in her chamber stood a crucifix, to which she told all the sorrows of her heart, and "spoke to it as if it had been a person."

21. A strange apparition came and surprised her as she knelt one day before this altar. Her picturesque narrative of the occurrence may vie with the visions of Swedenborg. "All on a sudden I saw Heaven open, as it were with a mighty rift of lightning, whence issued forth the figure of a man in holy vestments, wearing a cope of brilliant scarlet hue, brodered with gold, and loaded with shining gems of divers sorts. On his head was the semblance of a lofty mitre, made of the same rich stuff as the cope, but more enwrought with gold. He was of middle height, of venerable aspect, with nearly flaxen hair reaching below his ears, and beard of like colour, closely cut but not shaven. He descended to the level of my head, and then standing

upright, he said in a firm, set tone, 'You shall re-establish my order in the perfection of which you are desirous.' Trembling, I said, 'Who art Thou?' He answered, 'I am Augustine.' 'Augustine' I repeated, 'is never like that!' For I had never seen St. Augustine depicted save with a long black beard. His answer was, 'Cultivate this Vine, and it will bring forth fruit, such as you see.' Then in an instant he vanished, leaving in his room a lovely vine laden with beautiful grapes, and covering the wall of my room to the ceiling. For a long time I gazed in wonder, not knowing what it might be, or whence it came. I noticed only that its stem rose from beside my knees. I was all aghast, scarce discerning where I was, or whether I were alive or dead. Then my eyes fell, and glancing at myself I saw that I was dressed in a grey habit with a black mantle above it. This made me wonder more than ever, and, on turning to look once more at the vine, lo it was gone, and I was alone in my room, on my knees, the attitude in which I had placed myself, but clad in this religious garb. These marvels held me as in a dream or trance while they lasted. On coming to myself again, I no longer wore the strange dress, but remained in an extasy, not comprehending what it all meant; for never had I heard speak of the re-establishment of an Order, nor even did I know what an Order was. This took place in the year 1635, without further light or explanation."<sup>5</sup>

22. Somehow or other, though the vision did not seem to carry its own interpretation with it, Anthoinette conceived that she was to be the instrument in the reconstruction of Christianity, and that the first step in this direction was to be her seclusion from all human ties. Again she heard a voice speaking to her; and in answer to her query, "When shall I be completely thine?" the reply came, "In

<sup>5</sup> *Parole de Dieu*, pp. 7-9.

the desert." Hence her singular resolve of running away from home, in the habit of a hermit, to seek some solitary place where she might find herself alone with her Heavenly Master. Her feelings at this time are given forth, with great earnestness and beauty of natural expression, in some verses which she wrote early in 1636, and of which the last may be thus attempted in English.

No more I sigh for earth or heaven,  
 Sweet Jesus mine!  
 Love pure and bare to me be given,  
 Nought else of thine!  
 The gifts and treasures of thy grace  
 I crave not now;  
 Take each one back, and in their place  
 Come only Thou!<sup>6</sup>

23. The determination to leave her home was hurried on by the knowledge that her father had promised her hand to a rich French merchant. Indeed, the very day was fixed, and the wedding trousseau provided; when, fortunately for her schemes, the bridegroom's arrival on the scene was delayed by an accident, and she was able to get off before he could make his appearance. She bought a quantity of grey cloth, which during the night she manufactured into a sort of habit, working stealthily at this task; while during the day she dressed more gaily than was her wont, in order to evade suspicion. On Easter Eve she cut off her hair, put on her hermit's dress, passed a wakeful night, and at four o'clock

<sup>6</sup> Je ne veux plus ni Ciel, ni terre,  
 Mon doux Jésus.  
 Votre pur Amour solitaire,  
 Qu'il soit tout nud!  
 Ne vous aimant ni pour vos grâces;  
 Ni vos faveurs:  
 Vous rendant tout, pour faire place  
 Au seul Donneur.

on the morning of the 23rd March, 1636, she was on her way. As she passed her father's bedchamber, he called out to know who was astir so early, but a word from his daughter satisfied him. Whither her steps would lead her she knew not. She had with her nothing more than a single sou to buy bread for that day, but as she left the house she seemed to hear a voice which said to her, "Où est ta foi ? Sur un sou !" She instantly threw it away, begging pardon for her fault, and saying, "No, Lord, my faith is not in a penny, but in thee alone."

24. Quitting Lille by the south-east gate, she reached Tournay (Doornyck) by ten o'clock; heard mass there; and taking the road to Mons (Bergen) passed on to the little village of Basecles (Bassec), which is about as far from Tournay as Tournay is from Lille, that is to say, some fifteen miles. Just as she was leaving it, her disguise was penetrated by the quick eyes of some children whom she passed as they were at play on the outskirts of the village. They stared at her, and immediately began to shout that it was a girl. This discovery roused the curiosity of a band of troopers, who were lounging about the village market place; they jumped on to their horses and chased her as she ran off, soon caught her, and took her on with them to the next village, Blaton, where, had it not been for the protection of the Maire, and the firmness of the parish priest, who rescued her from the clutches of her pursuers, she would certainly have been violently handled by the captain of the troop.

25. The parish priest of Blaton, George de Lisle, was himself a devotee to the discipline of austerity. The great shock of seeing a friend shot dead by his side as they returned together from a Shrove Tuesday feast had deeply impressed his mind, and converted him from a hearty, merry, easy-going country clergyman, into a rigid ascetic. For the

rest of his life he drank no wine and ate no animal food. He hung a rotten leg of mutton in his room to inspire him with a disgust of the pleasures of the palate. He encouraged a smoky chimney, and went seven whole years without drinking any liquid, not even water. He constantly wore an iron chain, which went twice round his body, and cut into his flesh. He had his coffin made, and used no other bed than this, with a stone for his pillow; but every night, from eleven o'clock till two, he was to be found on his knees before the high altar of his Church. As was the case with John Bunyan in Bedford Gaol, two books composed his library, the Holy Bible and the Lives of the Saints, of which he was accustomed to say, "Here is the doctrine; and there is the practice." His fame for holiness, and for an almost miraculous influence which he had gained thereby, was spread throughout the country. His end was tragic. A heretic soldier of Lorraine, whose evil life he had rebuked, and out of whom he had once exorcised an unclean spirit, cherished for three years a murderous purpose against the saintly man; and, seizing at length his opportunity, shot him on the evening of Good Friday, 1648, as he knelt before the high altar; and when he fell, still living, rushed up and clave his skull with a sword.

26. This was the holy man into whose hands Anthoinette fell, when her pilgrimage was thus rudely interrupted at Blaton. With great judgment, Père De Lisle dissuaded the poor girl from pursuing her rambles in search of a desert abode. He found her a temporary lodging and hiding-place in the disused organ-loft of his parish Church; and sent off at once to Mons, to consult his superior, Mgr. Vanderburg, Archbishop of Cambray (Cameryck). This prelate, a good but weak man, promised to come to see her, and did so after ten or twelve days had elapsed. At first he gave her permission to stay where she was as a recluse at Blaton. But

on the very day of the Archbishop's visit her parents arrived upon the scene, sent for, perhaps, by Mgr. Vanderburg himself, though Anthoinette was persuaded that it was a mere coincidence, the father having anxiously sought his daughter up and down in every possible way. The result of a second interview, was that Anthoinette was prevailed upon to return peacefully home again, the father promising not to urge her any more about marriage, and the Archbishop allowing her to seek his advice again in case of necessity. Instead of taking his daughter straight home, M. Bourignon thought it prudent to let the notoriety of her exploit calm down first, and therefore left her for five months in a convent at Tournay, to her unspeakable relief.

27. When at length the poor girl returned to Lille, she shrunk into herself more than ever. If she went abroad, dressed in mourning, people would say, "There goes the hermit!" At home, her father called her "bigot" and "saint," and forgot his promise. Her mother, indeed, who perhaps began to understand her better, seems to have relented to her; at least we hear of no more persecutions from that quarter. The evident religiousness of the girl's nature, and the goodness of her intention, however strange and mistaken, could not but win a portion of respect even where there was no love. For a year Anthoinette continued to attend church twice a week, and regularly to visit the poor; but her experience of the latter was not encouraging. They were deceitful, she said, and not thankful to God; but the more they got, the more they sinned. Thus disappointed and disheartened, she left off attending them, and gave what alms she could to the Church. Several ecclesiastics volunteered their services as her spiritual director, but she declined their good offices, and rarely confessed, and then only to her own parish priest. Her faith in the confessional was shaken; for a Jesuit Father, in confessing her,

had counselled her to get married, in accordance with the wish of her relatives. By degrees she went less and less to Church, finding in the solitude of her own chamber a more religious quiet and recollection. Here she constructed a small grotto or miniature Calvary, and made it her delight to worship near it by night as well as by day. Strange noises and shadowy forms occasionally visited her, but to these she gave no heed, being persuaded that they were the work of the Devil. She gave up at last all vocal prayer, finding it impossible to say her office without distraction, and believing that inward devotion was more pleasing to God. With her parish priest, however, she still maintained a religious connection, writing him from time to time her thoughts, in the form of letters.<sup>7</sup>

28. At the end of a year and a half, being again much teased about marriage by her father, who feared she was losing her wits, she asked his permission to go once more and seek advice of Mgr. Vanderburg. "Go to the Devil; I won't come and look for you a second time," was M. Bourignon's testy rejoinder. So, in the middle of October, 1689, she presented herself at the Archbishop's residence in Mons, and begged him to place her somewhere in his diocese where she could begin a new life, disengaged from all earthly things; as one mode of living to which she believed that her example would bring many followers, and thus be virtually the means of a re-establishment of the true Christian ideal. The worthy Archbishop asked her what she meant by a life disengaged from all earthly goods; adding, "We cannot live upon nothing." She replied, "We will till the ground, and derive our supplies from the fields, without asking money of any who come to join us. Poor and rich shall

<sup>7</sup> These letters were afterwards collected and published, under the title of *L'Appel de Dieu et le Refus des Hommes*, which is thus the earliest of her works in the order of composition.

be alike welcome. We will aim at nothing but pure necessities, and to please God." He said she proposed great things, and he would think about it. Meantime he placed her in a religious house of the Sisters of Our Lady.

29. While here, a few of the younger Sisters, Marie Malapert, Anne du Bois, and two others named Labarre, became greatly attached to her, venerating her austerities, and admiring the holiness and excellence of her thoughts, which seemed to them the leadings of the Holy Spirit. These girls would fain have joined her scheme. The Archbishop, too, seems to have convinced himself that she was the subject of some special illumination and guidance. Père du Bois, whom he had commissioned to examine her, confirmed him in this belief. She obtained the requisite permission to read the New Testament; and, having done so, found its precepts so entirely in accord with the voice of her own inward directions, as to make her feel and say, that if she had committed these to writing she would have produced a work similar in substance to the teachings of the Gospel. She resolved therefore, henceforth, to be satisfied with the inward guidance alone.

30. At length, a suitable site was found, in the village of Blaton, and the Archbishop was preparing to give her formal leave to begin the Society which she craved permission to establish. But the Jesuit Fathers, who were the spiritual directors of the Sisters of Our Lady, began to smell a rat. They did not approve of any of these spiritual novelties. They insinuated that Anthoinette was guided by an evil spirit; of which there needed no other proof than her living without a Confessor. They warned the Sisters to keep clear of her, lest they should be infected with her follies, saying that one such as her was a pest in a community. Having, through the confessional, become aware of the projected scheme, they immediately used all their influence with



the Archbishop to stop it; and they were successful. Mgr. Vanderburg was forced to revoke the permission he had already given, and the dearly cherished ideal of his protégée was denied the proof of an actual experiment.

31. Anthoinette retired to Liège (Lüttich), and, taking a small lodging there, she supported herself by lace-work. The parish priest of Little St. Martin's invited her to settle there, and conduct under his guidance a religious house, but the news of the death of Marie Malapert,—whom long afterwards she described as "the purest soul I have ever known,"—greatly affected her, and she resolved once more to shut herself up in her first retreat, the empty organ-loft at Blaton. In this old haunt she sojourned awhile, but perceiving from the language of the Bailiff of Blaton that her relations with Père de Lisle were liable to misinterpretation, she took refuge at Mons, with some Grey Sisters of Bavay, who were chiefly such as had lost their homes by the fortune of war. Subsequently to this, though still pining for a life of solitude, she accepted the hospitality of a religious lady of wealth and position, Dame Anthoinette Doigny, Comtesse de Willerwal, who lived a very retired life at her château of La Deusse, between Ath and Chièvres, ill-grieving for the death of her brother the Comte de Willerwal, who had been killed by a cannon-shot at the siege of Arras (Atracht). The Countess treated her with every mark of kindness, but somehow the life was not strict enough for her. How could it be, when she deemed it an almost sinful waste of time to take a walk round the garden after dinner, instead of adding another half-hour to pious and solitary meditation?

32. From La Deusse she was summoned back to Lille by the serious illness of her mother, who died in July, 1641. On her deathbed she had expressed a strong desire to see her child once more, and the mother and daughter spent a few

sacred hours together, both of them being much comforted by the interview. When the death occurred, Anthoinette gave way to an emotion which with her was very unusual, and which revealed a really affectionate heart. Alas, that her mother had never known how to reach it till too late !

33. After her mother's death, Anthoinette was prevailed upon to assume the management of her father's household ; and on doing so she voluntarily abandoned some of her ascetic practices, and greatly moderated her austere way of living, confessing that she had gone too far, further even than she dared tell any one, and that it was better to preserve a life of inward devotion than to seek outward mortifications. Still she made no return to the gaieties of the world, and doubtless her father, though she nursed him most tenderly through an illness which confined him to bed, unable to move hand or foot for six weeks, found, in his hours of health, that his once favourite daughter was but an irksome house-keeper for a man of his pleasure-loving temperament. She fell ill herself after nursing her father, and remained for eight days in a trance, during which, while all around her were doubtful if she lived, she saw visions of judgment and heaven. As soon as she recovered, her father announced that he was going to marry again, and in October, 1642, he did so, taking for his partner, though he was above sixty years of age, a young girl of low origin and mean condition, without either wit or beauty, and who could scarcely read and write. Four months were enough to prove that the stepmother and daughter could not comfortably inhabit the same house ; and Anthoinette once more resolved to leave home, claiming for her maintenance, but unsuccessfully, what nevertheless she was legally entitled to, a moiety of her mother's property.

34. Five years more passed, during which Anthoinette lived away from home, in great poverty and greater contentment, supporting herself cheerfully by the use of her needle.

Her first abode was at a suburb of Lille, the Faubourg St. Pierre, where, attached to the cemetery of St. André, was a little sort of hermitage, built formerly for a female recluse named Jeanne Cambry. Here she took up her abode. Strange to say, the nephew of the parish priest fell in love with her, and persecuted her for some time with his unwelcome attentions. However, she managed to stay here four years, and was only driven from it by the approach of the French army, who advanced to the siege of Lille, in 1646. A garret under the roof of some good Sisters, who kept school at Lille, became her next retreat, but as winter came on this proved a sorry refuge. The rain poured in through the tiling of the roof, and often, on waking in the morning, she would find her miserable pallet all whitened with the snow that had fallen on it. Not willing that her health should permanently suffer, she went to pay another visit to the Comtesse de Willerwal, who received her with open arms, and gladly entertained her as long as she could stay, which proved to be about a year.

35. Her father's illness, resulting in his death, recalled her to Lille, and she dutifully performed the last offices to him. It was noticed by her as a coincidence, that her father passed away on the very day, Easter Eve, 1648, and at the very hour, when Père George de Lisle expired of the wounds he had received on Good Friday, at Blaton. The death of her father severed the last link of her old unloved family life. Her sister, who while she lived had gone through the ceremony of paying her a yearly visit, died in 1647, without issue, though she had been twice married, the second time to an advocate, Charles Van Torré. Accordingly, the whole of her mother's property now fell to Anthoinette, half she retained, and the other half she resigned to her father's children by the second marriage.

36. What use should she make of the comfortable

income of which she now became possessed? She was far from desiring or intending to spend her means on herself. Of mere almsgiving to the humbler classes she had learned the futility. A more practical plan engaged her thoughts. She looked out for poor children whom she could benefit, and in the end devoted, for many years, the chief part of her resources to the teaching and training, as well as feeding and clothing, a number of destitute girls, whom she took to live with her, not altering meanwhile her own style of living in the least, but denying herself everything but the barest necessities as heretofore. And here comes the strangest episode in her story. In the pursuit of her pious and philanthropic work, she encountered two great dangers which successively well nigh proved her ruin.

87. Her first peril resulted from the artful machinations of a villain, who, under colour of encouraging her schemes, and embarking in a similar one himself, first of all embezzled her money, and then attacked her reputation. Being one day in the street on some errand or other, she was accosted by a man, whose person was unknown to her by sight, though he had acquired some notoriety in Lille, by putting on an unusual appearance of devoutness and charity. This was Jean de Saint Saulieu, a native of Mons-en-peule, near Douay. He was a little man of insignificant appearance, and of no birth or breeding. Originally he was a shoemaker; then for some years he had been a soldier; now he called himself a teacher. When he walked the streets his eyes were always cast upon the ground; but he was most often seen at church, where he remained for hours upon his knees. He gave all he had indiscriminately to the poor and the ailing. In short, the whole complexion of his external semblance of piety was of a kind which contrasted at all points with the simplicity of the poor lady upon whose notice he now thrust himself. He spoke to her of the pitiable necessity

which there was that something should at once be done to provide for the education and maintenance of the many poor children left orphans, or altogether destitute by the recent wars. He suggested that Mdlle. Bourignon should undertake to supply the urgent want, and devote herself to giving the requisite nurture and instruction to these neglected little creatures, looking after their needs, and teaching them their Catechism. "How can I," she replied, "teach them their Catechism, when I do not know it myself?" St. Saulieu had scarcely anticipated an objection of so special and spiritual a nature, but he was not to be put off or rebuffed. For a year and a half he continued to improve his acquaintance, taking pains to make himself familiar with those topics of religious sentiment and discourse which he judged would prove most acceptable; giving his dupe a great opinion of his personal sanctity, telling her he was dead to nature, and referring her to his confessor Père Luc Roussel, who pronounced him a man of apostolic zeal. He spoke so well that she thought him as holy as he seemed, and at length entered into his project, which was that she should undertake the management, on a large scale, of a hospital or school for poor girls, especially orphans.

38. Mdlle. Bourignon entered on her new career on the 6th November, 1653, by assuming the charge of a small establishment for poor orphan girls, which had been set on foot some twelve or thirteen years before by John Stappart, a merchant of Lille. This establishment originated in a sort of asylum for peasants, who had been driven into Lille at the time of the siege, many of whom had subsequently fallen sick and died, leaving their children unprovided for. St. Saulieu was already employed to teach the orphan boys, and the management of the hospital for girls Mdlle. Bourignon was at length prevailed upon to undertake. On entering upon the conduct of this place she found everything


in disorder, the house was filthy, the manners were those of a bear garden, and the poor children as ignorant as little beasts. She soon put things to rights, enforcing order and obedience, and from her own resources enlarged the institution, increasing the number of inmates from twelve to fifty. This large family she succeeded in bringing into the most exact and punctual observance of a systematic set of habits and rules, till the establishment almost attained the regularity and precision of a machine for discipline and instruction.

39. St. Saulieu congratulated Mdlle. Bourignon on the success of her management and training. He professed himself anxious to try the like experiment himself. By much persuasion he prevailed upon her to become surety for him in a scheme which promised to realise a large sum of money, to be applied in furtherance of a charitable institution for orphans boys. In the event, the scheme it is true yielded large profits, but nothing more was heard of the benevolent design of its promoter; the proceeds enriched his private purse. Their fortunes being thus to a certain extent identified, St. Saulieu threw off the mask, and confessed to his patroness that he was not the holy or mortified being he had pretended to be; said he had, from the first moment he saw her, been dying of love for her, and pressed her to marry him. When she shrank back in loathing from his proposal, the rascal did not scruple to threaten her honour, as a means of inducing her compliance. Nor did he desist from carrying out his threat, by circulating injurious reports of his relations to her, until a legal process brought him to his senses. He then openly returned to profligate courses, and died three years afterwards in a fit of delirium.

40. The second danger which awaited poor Anthoinette was of a yet more extraordinary kind, being nothing less than a chain of most singular circumstances, through which

she and her whole establishment fell under the suspicion of practising witchcraft and sorcery. Resolving never again to incur the peril of misplaced confidence in strangers, Mdle. Bourignon had got the Bishop of Tournay to put her establishment under the same protection as the religious houses, so that no man might henceforth be allowed to enter its doors. The little orphans were thus kept more than ever secluded and confined. But it would seem as if all this strictness of discipline overshot its mark, and produced a terrible revenge of nature. Seven years had passed since Mdle. Bourignon undertook her difficult office, when there came a day, in 1661, memorable for the first of those strange incidents by which her establishment was very speedily broken up.

41. "In order to punish one of the girls for some misbehaviour, she had been locked up in a place they called the prison. An hour after, out she came, the door not having been opened for her. As soon as the other girls saw her come into the workroom, the colour faded from their faces. I turned round and perceived it was the very girl who had been locked up. She asked forgiveness, promising to behave better. I then asked her who had opened the door and let her out. 'A man,' said she. I told her she was dreaming, as no man ever entered the building, and bade her go to her work again. The maid who had locked her up was then out. When she came back, and found the girl at her work, she was much puzzled, and said, 'Who has opened the door for her? I have the key.' I desired her to go herself and examine the place. She found both doors still fast locked, as she had left them. I took the child to my own room to question her privately. She told me that a man whom she called her 'friend' had come and opened the door for her; and that she always summoned him when she wanted help. I could not help fearing that this 'man' was



the Devil. I sent for our priests, and told them all about it; and, after having closely questioned the girl, they told me there was great reason to suspect that she was a witch. Though not willing to believe this, I nevertheless got her out of the house as soon as I could, fearing she might be under the influence of an evil spirit, and so only bring trouble to the house. She was between thirteen and fourteen years of age. I did not forget that now the whole wrath of hell would probably be directed against me; so I prayed for strength to encounter and to vanquish it."<sup>8</sup>

42. Three months later, another girl of fifteen years old, who was about to be locked up for stealing, declared that the Devil, who came to her by night, had made her do it. She was instantly expelled.

43. After another three months, a third girl, this time "no more than eleven years old, who was going to be whipped, said, 'Don't whip me, and I'll tell you who made me do this wrong.' I took her aside to my own room, and she said, 'It was the Devil.' I asked her if she knew the Devil well. 'Yes,' said she, 'he is nearly always with me.' I asked what he was like, and she said, 'like a beautiful boy, a little taller than myself.' She added, that he had put a mark on her head; that she had given her soul to him, renouncing God and her baptism. I forbade her to mention anything of this to anyone, and sent for the priests, much troubled to know what was the meaning of all this, and believing it to be some illusion or frenzy."<sup>9</sup> To the priests, the poor child confessed that there were two others as guilty as herself; they in turn accused others; and thus, by degrees, the two and thirty girls then in the house were all in general, and each one in particular, convicted of having bound themselves to the Devil, of their own free will, before they came under Mdlle. Bourignon's care. She was full of compassion for the

<sup>8</sup> *Parole de Dieu*, pp. 83-84.

<sup>9</sup> *Parole de Dieu*, pp. 84-85.



poor creatures, and hoped to reform them, so she expelled no more, but called in the aid of ecclesiastical exorcism and advice.

44. It is a strange story, but, like every similar story, it inevitably grows. Comparing Mdlle. Bourignon's earlier narrative in the *Parole de Dieu* (1663), with her corrected account in the *Vie Extérieure* (1668), it is observable that, in the latter, none of the original doubt as to the reality of the diabolical possession finds a place. The first two instances of detection are mixed up together; the girl's surname is said to have been Bellot; and other particulars are given. In the third case of alleged sorcery, the girl's age is raised to "about twelve"; the 'mark' on her head, described as so insensible, that a bodkin, as long as one's little finger could be thrust into it without causing pain; and the history of her devoting herself to the Devil, when she was but a little thing of ten years old, playing with the other little girls of the village, is very picturesquely given.<sup>10</sup> The account rendered by Poirer, in the *Vie Continué*, is still further enlarged and crammed with marvels. The girls bewitch cats, birds, and other animals; they receive poisonous pills from their diabolical consorts, with which they make attempts upon the lives of good people. In short, we are in the midst of horrors. Thus do all such narratives improve in the telling.

45. The source of the poor children's witchcraft is in all probability not far to seek. With all her benevolence, their protectress was a disciplinarian of the most severe stamp. She approved of the conduct of a Flemish Countess (the mother apparently of her friend at La Deusse) who educated her daughter on the sole principle of thwarting the young creature's wishes in everything; anything she liked or wished for was to be instantly denied her.<sup>11</sup> The discipline of the

<sup>10</sup> *Vie Extérieure*, pp. 200-214.

<sup>11</sup> *Solid Vertue*, ut. sup. p. 87.

Orphan Establishment, though it succeeded, we are told, in turning out excellent domestic servants, was dreary and hard in the extreme. "Everything was regulated from morning to night, without intermission. They rose precisely at five throughout the year, and having spent half an hour in dressing and prayer, they learned to read and write till half-past six. Then they attended the private Chapel of the house. At seven they were set to work, during which they recited certain prayers in common. They breakfasted at eight, and heard some pious book read the while. At nine they sang spiritual songs. The next hour they spent in silence at work. At eleven they repeated the catechism. At noon they dined; after which, they took half an hour's recreation. And from one till eight they passed through exactly similar exercises to those of the morning. When they had supped at eight, they went into the oratory to pray, and after that they lay down in silence, and all the lamps were put out at nine."<sup>12</sup> If we add to this that the domestics grumbled because their mistress was always talking to them about damnation, we may form an idea of the rigour of the place. Under this formidable and oppressive routine the poor children had been, with the best and purest intentions, so cooped up and cramped by restrictions unnatural to their tender years, that the phantasy of a covenant with the devil had taken hold of their imaginations with an irresistible power. Just before the outbreak, their instructress had been telling them of a vision she had, in which many little, black, winged children were hovering in the air, and bidding them beware of the devil, or he would certainly get hold of them.<sup>13</sup> It had been a childish sport, we are assured, for one of the girls to tell another that if she would but go with them to the witches' Sabbath "she should have good cheer and a lover. As soon as she consented, the lover came on a little

<sup>12</sup> *Vie Continué*, p. 141.<sup>13</sup> *Parole de Dieu*, p. 83.

horse, and took her by the hand, asking if she would be his sweetheart. The moment she said 'Yes,' she was carried through the air, into a great castle, where they had all sorts of feasting and mirth. This happened three or four times a week."<sup>14</sup> Little wonder that more than one of the poor pined creatures clung with a pathetic mixture of belief and terror to this pretty dream, and, owning it to be a sin, yet declared, "I find too much contentment in it to leave it; I am always caressed."

46. Somehow the murder got out. It was commonly reported that the Orphan Hospital was an asylum of witchcraft. Mdlle. Bourignon herself was arrested for a witch, but, after great trouble and annoyance, acquitted, the poor girls, who had freely accused each other, exculpating her from any share in their wicked delusion. "No, no," said they, "our mother is no witch; our mother is a saint; she is full of God." In the end, her old enemies the Jesuits got possession of the Hospital; admitted the girls to confession and communion; made them pass for little saints; and cast every slur in their power on the character of the conscientious, if mistaken, lady to whose work they had succeeded.

47. Escaped thus, not without serious discomfort, from two most formidable dangers, Mdlle. Bourignon wisely avoided for the present any further entanglement in active or business matters. On leaving Lisle, in 1662, she may almost be said to have closed her philanthropic career. She now entered upon her period of authorship. Settled home henceforth she had none; friends indeed she found in plenty, but they were sometimes persecuted as severely, or more so, than she was herself. It is a painful task to follow the course of her wanderings, and the account shall be rendered as briefly as possible. Her first removal was to Ghent, the

<sup>14</sup> *Vie Extérieure*, p. 214.

busy, prosperous city, where she arrived in June, 1662. Here she heard of the fate of her loved establishment. Mortified by the failure of her schemes, she could too easily bring herself to believe in the universality of the diabolic covenant. She had so long looked in vain for the Land of the Christians, that, as the result of her search, she felt assured that no Christians were to be found on earth now at all. She thought it her mission to restore, almost to replant, Christianity on the earth. The sense of her wrongs sank very deeply into her heart, and made her anxiously on the watch for opposition and ill treatment. She expected opposition. She could not divest herself of the haunting idea that the Devil was continually plotting and fighting against her.

48. At Malines (Mechelen), her next place of abode, she was more happy. In this quiet and beautiful Cathedral town, she found friendly ecclesiastics, who were willing to listen to her teaching, and who heard it with ears of sympathy. Among them were the Archdeacon Coriache, afterwards Vicar-General; Pierre Noels, one of the Canons of the Cathedral, and formerly secretary to the famous Cornelius Jansen, Bishop of Ypres; and Chrétien Barthélémy De Cort, Superior of the Fathers of the Oratory. Her intercourse with these learned men led in each instance to the production of one of her works. She wrote the earliest account of her life, *La Parole de Dieu*, at the request of Père Coriache, in 1668. It was from conversing with Père Noels upon the discussions then at issue between Jansenists and Molinists respecting divine grace, that she drew up, between 1666 and 1667, the twenty-seven tracts afterwards collected and printed as *L'Académie des Sçavans Théologiens*. Noels, who was delighted with the substance of the book, kindly offered his services to amend the orthography and revise the style. She took time to deliberate upon the

proposal, and received this oracle upon the subject from her inward monitor. "What rashness for men to offer to correct the works of a God!" Her instinct was probably a right one, though the boldness of the expression is startling. Doubtless she had a real gift of spiritual insight, and the native unstudied manner in which she put forth the manifestations of it would only have been spoiled by the application of those rules on which the tastes and habits of cultivated minds are formed.

49. Of all her acquaintances at Malines, the most faithful disciple was Père De Cort. Both he and Coriache acknowledged her as their spiritual mother, and the two friends would have their joke together on the unequal sizes of the two spiritual children, the Archdeacon being a little man, and De Cort a stout corpulent person. He had a large heart within this bulky frame, a heart capable both of generosity and of endurance. Being a man of some property, he had conceived the idea of founding a free school for poor children; but an appeal reached him from a quarter which he was unable to resist. The little Isle of Noordstrand, off the coast of Denmark, some fifteen miles from the mouth of the Eider, containing about twelve square miles of land, had been twice inundated by the sea. Certain of De Cort's relatives appear to have been connected with it in some way; and having been solicited for help towards reclaiming the submerged land, he advanced almost all his means for this purpose. His unsuspecting temper prevented him from looking closely after the securities, but in repayment of his loan he was to receive a part of the reclaimed land, and the tithes of the island, along with its spiritual direction. The interest he thus acquired in the place was a perpetual trouble to him, giving rise to jealousies, complaints, and enmities which scarcely ended with his death. This was the man who became Mdle. Bourignon's most constant friend. He

was in the habit of taking down, from memory, a record of her conferences with him; and when he had compiled in this way, between 1664 and 1667, a considerable volume, he submitted it to his instructress for her approval. She rewrote the entire series of papers, and they formed, when thus revised, the book to whose title we have already been introduced, *La Lumière du Monde*.

50. It was with great reluctance that she left Catholic territory in September, 1667, to make some stay in Holland. Protestants she had been taught to think of as little better than heathens, and her dream of the Land of the Christians never assumed the shape of the Dutch Republic. She had never yet been in any place without the obedience of the Roman Church, and knew not what sort of people she might meet with elsewhere, having been taught as a child to imagine them of a different shape to those of her own country. All her conferences hitherto had been on subjects within the Roman Church. She knew no other religion, "and (with compassion) looked upon all those who died out of the Roman Church as damned."<sup>15</sup> Yet to Holland she must go, if she meant to see after the printing of any of her writings; it was not safe to attempt this in Flanders. Père De Cort, who accompanied her, and by doing so lost his office, and exposed himself to the suspicion of heresy, had much ado to prevail upon her to think of printing her writings at all, so averse was she to shock many in the Roman Church whom she tenderly loved. Purely a Catholic by breeding and conversation up to this point, her migration to Protestant territory, at the age of fifty-one, was not without marked and visible influence on her subsequent writing and thought. It supplied her with new ideas, and expanded those she already cherished.

51. On arriving in Holland, she chose a small lodging

<sup>15</sup> *Light of the World*, 1863, p. 214.

in Amsterdam, and hoped to live quietly. But her fame had preceded her. She found her obscure hiding-place the resort of the learned of every sect, and of fanatics of every party. The Cartesians, Heydan and Burmann disputed with her on points of religious philosophy. Anabaptists, Quakers, Socinians, all tried to convert her. Labadie, the well-known Quietist (1610-1674) was among those who sought her society, and leaned towards a belief in her. Quirin Kuhlmann, a forgotten eccentric, and pretender to revelation, paid her a visit, and addressed letters to her. Even our old friend Thomas Tany, or Theaurau John, seems to have found his way to her in 1667. For surely none but he would have been the "prophet" who "showed her his sword half drawn, and said he was going to behead all the kings of the earth, beginning with England; and so, entering into a little bark, it is not known what became of him." Enthusiasts flocked round her; prophets prophesied of her, till she was driven to seclude herself as in her old ascetic days. A further need for retirement soon arose in the hostility which the spread of her influence excited in the orthodox ministers of the Reformed Churches. She bought from De Cort a small property in Noordstrand, and thought of secluding herself there for the rest of her life. But the event proved that seclusion in her case could only mean a wandering life. So hard pressed was she sometimes to avoid the disagreeable intrusion of importunate visitors, impelled either by curiosity or a more unfriendly feeling, that she had sometimes to resort to stratagem for getting out of the way. Once we are told she was conveyed, in the middle of the night, from one end of Amsterdam to the other, concealed in a huge basket. This was at the beginning of December, 1669, shortly after the death of her excellent ally, M. De Cort.

52. The imprisonment of this good man was the first

of her great troubles, the beginning of that series of harassing attacks which did not cease till the poor lady herself had been hunted out of this life. Direct theological prosecution was in Holland impossible. To accuse De Cort, as his enemies did, of making four persons in the Blessed Trinity, by adding thereto an adoration of the Maid of Lille, was to employ a weapon which might wound his feeling and injure his professional character, but could not harm his person, in the absence of the Inquisition. Advantage was therefore skilfully taken of his peculiar position, as part proprietor of Noordstrand, to involve him in difficulties, from which he was not extricated till he had been thrown for six months into the debtor's prison, at Amsterdam, a place of savage and unwholesome durance, the severities and miseries of which vied with the tortures of the Inquisition itself. Six weeks after his release, De Cort was poisoned, at Noordstrand, by a travelling charlatan, whether purposely or not is unknown, and died on the 12th November, 1669, leaving Mdlle. Bourignon his heir. It was an inheritance of trouble.

53. All this time she was busily writing in exposition and defence of her views. Her publications at Amsterdam were *Le Tombeau de la Fausse Théologie*, against the errors chiefly of the Reformed Churches; *La Sainte Visière*, against the Cartesian philosophy, which she regarded as the worst heresy the world had ever seen, and indeed no better than Atheism, or a formal rejection of God; the autobiographical sketch comprised in her *Vie Extérieure*; a mystical treatise on *Le Nouveau Ciel et la Nouvelle Terre*; a picture of the state of the Christian World under the title of *L'Antechrist Découvert*; and a remedy for the same in the shape of *La Dernière Miséricorde de Dieu*. In defence of her injured friend, De Cort, she published *L'Innocence Recon nue et la Vérité Découverte*. Nearly all these appeared



in Flemish and German as well as in French ; she spoke, if *not* wrote, all three languages.

54. Leaving Amsterdam in 1671, she stayed for a few months at Haerlem ; and there the strong desire of some other more enthusiastic disciples to forsake everything and follow her fortunes as well as her teachings led to a drawing up of a written compact between them and their instructress ; a copy of this, dated 7th April, 1671, is given in the *Vie Continué*. On their part they solemnly engage before God to offer as a sacrifice to him their bodies, souls, and all their possessions for the furtherance of " his holy will, which they hope to learn from him or from his handmaid Antoinette Bourignon ; whom they choose as their spiritual mother, and promise to obey in everything which she shall tell them as from God." They further promise to abstain as far as possible from gainful work or trade, to the end of their lives, and to use their utmost endeavour to imitate Jesus Christ. She for her part receives them as her spiritual children, promising to declare to them the will of their Eternal Father according to their readiness to obey it, and " to have that care for their bodies and souls which a true mother has for her children ;" engaging moreover to do as much for all in whom she observes a like disposition. The names of four disciples were attached to this singular document. The first and the most faithful of these was Nicholas Henning, of Flensbourg. Mdlle. Bourignon permitted him, for a time at least, to quit the society of his reluctant wife, in order to keep the compact ; a circumstance which not unnaturally gave rise to much illnated talk.

55. In undertaking the conduct of this little band of friends who were willing to submit to her leadership, she declined to commit them, as she had before declined to commit herself, to any vows. She had no faith in mere external obedience, and relied upon her power of reading the

hearts of her children, and so directing them from time to time in the right way. For the exercise of this method of guidance, we are told she was specially gifted and endowed. "When it was God's will that she should discern the inward condition of her children and friends, a spiritual vision was usually sent to her, which brought them before her (frequently in childlike form) as if actually in her presence, some near her, others at a distance, now facing her, then turning away from her, some working, others playing; at times active and industrious, anon reposing and faint-hearted; sorrowful or joyful, fighting, fleeing, anguishing, and so on. In this way did God enable her very clearly to see their spiritual attitude before Him in their progress towards perfection; and this, whether they were present or absent, living or dead. Often, too, did He cause her to see and hear the plots and designs of her greatest enemies in the same vivid manner. This was quite apart from the inward speakings by which He made her conscious of her own spiritual condition, and that of her friends, when they prayed her to ask of God what the hindrance was in each of them which formed the chief barrier to their drawing near to Him and receiving of His spirit. That God revealed this to her in express terms inwardly heard, it is not necessary here to tell. But, in addition, He had this further way of communicating to her the knowledge of her friends' hearts, viz., to let her actually perceive them, either in a sudden ray of light, as it were, or in a solemn act of meditation with God, begun with the intention to learn from Him truths of this kind. Thus did He make her perceive the most secret and hidden thoughts of their hearts, and, when necessary, of the hearts of all those with whom she had to deal. To one, she would discover his newly formed and secret thought of taking such and such a step, asking him, 'Why he meditated that?' To another, she would declare that he was under such and such

a temptation; and to a third, that such and such things would befall him. Nothing was more common than for her friends to experience this."<sup>16</sup>

56. Tonningen in Holstein was the place where the new community made their first settlement. Here they landed, on the 13th June, 1671, a little company of six, of whom Anthoinette and another were the only women. Unable to preserve their incognito, or to avoid unpleasant intruders who dogged their steps, they remained barely a month at Tonningen, but passed on to the town of Sleswic, where they were unmolested. During the year of their stay here, Mdle. Bourignon wrote her *Avertissement contre la Secte des Trembleurs*, in reply to an attack in Flemish by the English Quaker, Benjamin Furly, of Colchester, then a merchant at Rotterdam.<sup>17</sup>

57. Her little flock increasing in number, she moved, in July, 1672, to a larger residence at Husum, expecting to be reinforced by a goodly number of persons who had already arrived there from Friesland, with the intention of joining her community. But she found on acquaintance that nearly all of these new comers were quite unsuitable for her purpose, and despatched the greater part of them to Noordstrand. Even those whom she allowed to stay with her proved of little help to her cause; all of them eventually went back to their original secular callings; most of them became her bitter enemies and calumniators. This disappointment was the occasion of her composing two treatises, *Les Pierres de la Nouvelle Jérusalem*, and *L'Aveuglement des Hommes de Maintenant*. In the first of these, a series of letters, she

<sup>16</sup> *Vie Continué*, pp. 437-438.

<sup>17</sup> *Anthoinette Bourignon ontdeekt, ende haeren Grest geopenbaert uyt haere Druckten, den Grest Godts niet te Zijn klaertijck bewesen uyt haere eygen Schriften &c., Door Benjamin Furly [part by Stephen Crisp], 4to., Amsterdam, 1671. See Smith's Cat. of Friends' Books. A copy is in the Devonshire Square Library. It has never been translated into English.*

described the necessity of that true Christian character which she was anxious to re-establish in its purity. In the second, she dealt very plainly with the failings of her Frisian visitors, and incidentally exposed what she deemed the errors of the Mennonists, an Anabaptist sect, with which most of these would-be disciples had formerly been connected. For the instruction of her faithful children, she began the *Traité de la Solide Vertu*; and, as her own defence from various slanders, she published the *Témoignage de Vérité*, appended to which were copies of attestations, given at various times by persons of all ranks and religious persuasions in Flanders, Holland, and elsewhere, who bore witness to the purity of her character and the excellence of her motive. What made this array of testimony the more striking was, that some of these very persons had since turned against her.

58. That she might be able to get out these works under her own supervision, in the three languages which she understood, she sent to Holland for a printing-press. She was not long, however, permitted to make use of it. In September, 1673, the Lutheran ministers of Husum and Sleswic, Dr. Nieman and Herr Burchardt, obtained an injunction against the use of her printing-press, and laid an information against herself and her followers. This charge came to nothing; but the printing-press was not restored. In this strait, Mdlle. Bourignon made an effort to remove, unobserved, with her little band of friends, to Flensburg, where Nicolas Henning gladly received her into his house in December, 1673. But Flensburg proved a more hostile place than Sleswic, and she accordingly returned to Husum at the beginning of 1674.

59. Major General Van der Wyck, the commander-in-chief of the district here, stood her friend against the preachers who opposed her; and hence a paper warfare was

resorted to in place of an actual persecution. The redoubtable Burchardt entered the lists with his *Christliche Grundliche Anmerkungen, Solid and Christian Remarks on the Blasphemous Errors of Antoinette Bourignon*, to which she responded by the *Pierre de Touche*, published in French, Latin and German. Burchardt had no fresh matter to bring forward in reply, but he doggedly repeated his former charges in his *Widerhöflete Erzählung*, a sort of 'could kail het again.' Another antagonist appeared in the person of Wolfgang Ouw, Lutheran pastor of Flensburg, who launched forth a book with the portentous title, *Apocalypsis Hæreseos*, that is *A Revelation of the Heresy with which Antonia Bourignon has striven to poison by her writings the good Lutherans of Holstein*. It was a coarse, unmannerly production, and deserved no reply except the dignified silence with which it was received by the lady attacked.

60. From time to time Mdle. Bourignon had attempted to assert her rights, under the will of M. De Cort, to the possession of property in Sleswic. By the combined action of priests and pastors, a thousand obstacles had been thrown in the way of her peaceable succession to this estate, which she looked upon as likely to afford a suitable retreat for herself and her followers. A proposal was at length made to her, in 1675, that all opposition should be withdrawn on condition of her engaging that henceforth she would neither print books nor publish her doctrine, and promise the same reticence on behalf of her existing followers. Of course she could consent to no such measure of suicide.

61. Kielmann, the President of the Council, who was much impressed in her favour, and saw that the rumours of her heresies were hindering her from getting justice, advised her to draft a short Confession of her Faith, and present it to the Governor of Holstein; telling her that His Highness would never trouble his head with reading long-winded

controversies to find out which side had the best of it; but that a plain statement of her belief, in as few words as possible would put everything right. Acting on this suggestion, she drew up six brief heads of belief, in which, however, instead of setting forward her own peculiarities of opinion, she recited the chief points of her accord with orthodox theology. First, she was a Christian; second, she had been baptised in the usual form; third, she believed the Apostles' Creed; fourth, she held that Christ was very God and very man, and the Saviour of the world; fifth, she believed all the Holy Scriptures; and, lastly, she wished to live and die in this faith. This profession she solemnly attested as her own, by hand and seal, on the 13th March, 1675, at Sleswic. It is frequently found prefixed or appended to her later writings. The only remarks that need be made upon it are that it omits from view every speciality of her teaching, and that it entirely failed to have the effect which President Kielmann intended. No atom of the hostility against her was abated by the perusal of it. The impetus which it furnished to her own mind, in the direction of systematising her principles and maxims, bore fruit perhaps in *L'Instruction Salulaire et les Règles des Chrétiens*, which she wrote at this time for the benefit of her Spiritual Children.

62. Next year we find Mdlle. Bourignon repairing alone to the great commercial Free City of Hamburg, where she arrived on the 31st March, 1676. Here, for fifteen months she lived very quietly, occupying a tiny apartment in the house of a soldier, the only lodging she could procure on her arrival. She occupied herself in composing prefaces for several of her works, new editions of which were being brought out by some of her wealthier friends. And in addition to spiritual labour and conversation, she set a good example of plain practical usefulness, somewhat rare in a woman of her mental

gifts. "During the spring she employed herself in turning a useless yard, attached to the house where she lodged, into a little garden which she laid out very nicely and to some profit. She repaired and whitewashed her own room, and part of the house besides. She washed her own linen, and waited on herself entirely. She lived alone, and would let no one do anything for her except to buy her provisions, as she did not dare, there or elsewhere, to leave the house, for fear she should meet any one who knew her. She was most exact in all outward matters of decency and order, saying that this was more pleasing to God than the most sublime contemplations, which often supplied matter of attraction for self love and self gratification, and in the end gave rise to a restlessness and vexation of spirit, owing to the confusion produced by neglect of outward things; whereas going out of oneself, to work at the meanest duties, makes the heart humble and simple, and begets an entire and exact submission to God, a laudable charity and care for our neighbour, and a sure repose and contentment of soul. This gave more real satisfaction to St. Joseph in his carpenter's shop, than to the doctors of the law as they expounded in Moses' seat. She told how St. Theresa, having begun to write one of her sublimest works, and having interrupted it to spin, when her nuns begged that she would go on with her writing, she answered them that she must first finish her distaff. This Mdlle. Bourignon sometimes smilingly told to those who would persuade her not to employ herself in outward work, but to give her whole time to mystical and spiritual writing."<sup>18</sup>

63. Although thus peaceably and usefully employed, the hand of persecution would not let her alone. The Hamburg pastors in consistory assembled, and led on by Pastors Elmenthorst and Hessel, represented her to the magistrates

<sup>18</sup> *Vie Continué*, pp. 447-448.

of the city as holding a private conventicle, and wishing to establish a new sect. An unsuccessful attempt was made to seize her books and papers, and in the end she was obliged to leave the city, quitting it secretly on the 26th June, 1677.

64. After a month of painful wandering, Mdlle. Bourignon found what proved to be her last settled place of abode at the remote semi-island of Lutzburg, in East Friesland, under the protection of the petty Lord of the place. Her Spiritual Children, who had been left behind for fourteen months at Sleswic, were now permitted to rejoin her. Like their Mother, they had suffered in the meanwhile not a few injuries and molestations, and the happy reunion proved very grateful to all. It would probably be an actual relief to Mdlle. Bourignon's mind, when she heard that all hope of establishing her claim to the Noordstrand property was forfeited by her non-appearance in answer to repeated citation, when the case was argued in the Chancellerie of Holstein at Hamburg. Her interest in directly philanthropic work revived, and she took the direction of a new hospital in Lutzburg for the benefit of exiles and strangers.

65. In this retired spot, and with this congenial work to employ her, she lived happily for three years, and hoped to spend the rest of her life. She was indeed in need of a resting-place. Her health began to fail. A fever attacked her, and left her joints so weak that for a year she could scarcely walk. A trivial and untrue charge, of causing a boy of eight or nine years old to be too severely beaten, became magnified into a serious matter by hostile comment, and she was threatened with arrest. She rose from a sick bed to leave Lutzburg, intending to go as far as Amsterdam. But the end was nearer than she or her friends anticipated.

66. On the 19th September, 1680, she left Lutzburg, travelling by canal through Emden, Groningen, and Leu-



waerden. By the 18th October she reached Franeker, where she became so ill that she could proceed no farther. For twelve days she lay ill with fever and dysentery, rapidly becoming worse. She had, however, no expectation of death. Even when the worst was too plainly prophesied in her appearance, and she was giving her last orders and requests in the event of her death, she clung to the belief that some years of usefulness were yet before her. "If I die," said she, almost with her last breath, "it cannot be by the will of God; I have not yet accomplished the purpose for which he has sent me, I have not finished what I ought to be doing and writing." By mid-day on Thursday, the 30th October, all was over. A pure soul had ended its plaintive history.

67. In her old age the person of Anthoinette Bourignon is thus described. "She was of the middle stature, neat and slim, of a symmetrical countenance, a dark complexion, a clear forehead, an unwrinkled brow; a frank look from eyes of a bluish tint, and of such excellent sight that she never used glasses; rather a large mouth, full lips, and slightly prominent teeth;<sup>19</sup> her hair blanched with age; illness had wasted her cheeks, and deepened the setting round her eyes; her aspect, address and mien were sweet, natural and attractive; her pace was deliberate; and when she walked she held her head a trifle high. At upwards of sixty years of age she scarcely looked more than forty. All her senses, except the palate, were singularly acute; her spirits were lively and sustained, never sad, always even."<sup>20</sup>

<sup>20</sup> *Vie Continué*, p. 586.

<sup>19</sup> Here the description does not quite correspond with the engraving referred to in paragraph 7. The fact is, that during her life no likeness was ever taken of her. A copperplate engraving of her was published in Germany, which Poirer says was no more like her, in face or in dress, than it was like the Pope. To counteract the false impression produced by this caricature, Poirer himself, who had been in early life apprenticed to an engraver, executed a genuine likeness from recollection, which was published in Belgium. Petri Poirer *Posthuma*, 1721, p. 684.

68. Though she professed to write for the simple and ignorant, Mdle. Bourignon's teachings were chiefly found to take hold of the learned. They spread especially among divines of the various Christian Churches. Christian Kortholt, of Kiel, was one of her admirers, and confessed that it was owing to her conversations and writings that he had any just appreciation of theological truth.<sup>21</sup> This good Lutheran minister was the author, among other works, of a once famous refutation of Deism, published at Kiel in 1680, under the title, *De Tribus Magnis Impostoribus* (viz., Lord Herbert of Cherbury, Thomas Hobbes, and Benedict Spinoza), which was translated into German in 1700 by another Lutheran minister, Michael Born. The Moravian Bishop, John Amos (1592-1671) of Komna, hence called Komensky, or Comenius, is said to have favoured her opinions.<sup>22</sup> The celebrated wit and ecclesiastic, Gilles Menage (1613-1692), gives her an honourable place among the illustrious women of the time.<sup>23</sup>

69. Jan Swammerdam (1637-1680), the celebrated anatomist and entomologist of Amsterdam, was one of her followers. Under the influence of a religious melancholy, he threw up his profession in 1671. He then stayed some months in Mdle. Bourignon's society at Sleswic. He was in ill health to begin with, and his ascetic practices reduced him to a wreck of his former self. He persuaded himself that his favourite studies were unworthy to occupy a mind devoted to divine contemplation. It cannot be thought that on him Mdle. Bourignon's mysticism exercised the most favourable influence, or relieved his mind of the morbid tendencies brought on by overwork.

70. Pierre Poiret, the Calvinistic preacher and mystic,

<sup>21</sup> Petri Poirati *De Eruditione Solida*, &c., 12mo., 1692, p. 385.

<sup>22</sup> Hagenbach *Lehrb. der Dogmengeschichte*, 1840, § 224.

<sup>23</sup> Poireti *De Erudit. Solid.*, p. 388.

was the most painstaking and systematic of all Mdle. Bourignon's followers. He was born in 1646, at Metz, the son of a sword maker, and, losing his father when very young, had to shift for himself. Supporting himself as a tutor, he studied at Basle, Heidelberg and other places; was ordained in 1669, and licensed to preach in the French Churches of the Palatinate. Next year he married a rich widow, and as this rendered him independent of his sacred calling he did not long pursue it. From the beginning of his public life he was attracted to mystical views. Daniel Spanheim, the Librarian at Heidelberg, first introduced him to the writings of Mdle. Bourignon. He made her acquaintance at Hamburg, in June, 1676, and accompanied her to Lutzburg, at which place he paid her several visits, and was with her when she quitted it. He left her at Franeker, to make arrangements for her reception at Amsterdam, but returned too late to find her living. Between her death and 1686, he edited the complete series of her works in French, with her Life. To the *Nouvelles de la République des Lettres*, for April and May, 1685, he contributed a memoir of her life and writings. In 1703, he began to edit the *Opuscles* of Madame Guyon (1642-1717), whose life he wrote in 1718. He died in 1719, at Rheinsburg, near Leyden. Of his voluminous works, the best known is *L'Æconomie Divine*, 1687, rendered into Latin by another hand in 1705. Poiret's originality and insight were not great, but he was an eager reader and collector of all kinds of mysticism. It is a singular honour that it should have fallen to his share to edit the writings both of the greatest female Mystic and of the greatest female Quietist of his time. His idol, however, continued to be Anthoinette Bourignon.<sup>24</sup>

71. A few of the many writings which appeared in

<sup>24</sup> See the very interesting *De Vita et Scriptis Petri Poireti Commentariolum*, pp. 54, prefixed to the *Posthuma*.

opposition to hers may here be mentioned. The *Journal de Leipsic*, for January, 1686, contained an Extract of her Writings, conceived in a very hostile spirit. This was complained of in a following number by an anonymous writer; and in 1687 there appeared a full defence of the Extract in a separate volume, called *L' Apologie du Journal de Leipsic*, which is acknowledged to be from the pen of Guy Louis Von Seckendorf (1626-1692). A very unfavourable view of her personal temper and disposition is here taken. Seckendorf finds many traces in her writings which convince him "fæminam hanc duram, immitem, pervicacem, stomachobundam, rixosam etc. fuisse." Bayle, in his *Dictionnaire Historique et Critique*, gives a sneering account of her career, and of some of the peculiarities of her teaching. John Wolfgang Jaeger (b. 1647), Chancellor of the University of Tübingen, and professor of Controversial Theology, published in 1708, at Frankfort and Leipsig, *Examen Theologiae Novae et maxime celeberrimi Domini Poireti, ejusque Magistrae Mad. de Bourignon*. In 1716, he published at Tübingen, *Nova Purgatio Animae post Mortem excocata in Cerebro Mad. Bourignon et Petri Poireti, extracta ex Fumo Infernali*. Poiret replied to these attacks by Jaeger, and especially to his *Examen*, in the *Vindiciae Veritatis et Innocentiae*, which forms the third part of his *Posthuma*. Lamy, the Catholic author of the anonymous *Histoire du Socinianisme*, devotes one of his chapters to a very fair narrative of her life, compiled from Poiret and Bayle, adding an exposure of her errors. He is wrong in thinking that she "socinises," to use his own term; but he makes an acute remark in the course of his judgment of her, which is not without a grain of truth. "On nous dit bien qu'elle prêchat qu'il falloit renoncer à soi-même, et on sçait que jamais personne ne fut plus entêté de ses sentimens et de son humeur."<sup>25</sup>

<sup>25</sup> *Hist. du Socin.*, Paris, 1723, p. 549.

72. In England, Mdle. Bourignon's books seem to have been very little read or known. The nonjuror, Charles Leslie (1650-1732), devotes the Preface of the Third Edition of the *Snake in the Grass* to an exposure of her errors, as contained in the *Light of the World*. His indictment against her contains seven counts, pride, rejection of outward ordinances, uncharitableness, misrepresentation of the doctrine of Christ, heresy, contempt of Holy Scripture, and "other wild and barbarous notions." Poiret had told two gentlemen of Leslie's acquaintance that "he was as sure of that virgin's inspiration, as he was of the being of God."

73. It is somewhat remarkable, that in Scotland the writings of Mdle. Bourignon had for a time a great vogue. Yet it is true, Dr. George Garden, one of the ministers of Aberdeen, the friend of Henry Scougal (1650-1678), was responsible for the translation of such of them as appeared in English, and the author of the prefaces prefixed to the English editions. In these prefaces, the ecclesiastical courts of that day easily scented heresy. Dr. Garden was cited before the general Assembly of 1701. He did not compear, but his writings were condemned, and he himself deposed. His chief antagonist, outside the Assembly, was Dr. Cockburn, Episcopal minister of St. Paul's Chapel, Aberdeen, also a friend of Henry Scougal, and the editor of a volume of his posthumous sermons, including one preached at the funeral of Scougal by Dr. Garden himself. Cockburn's book was entitled *Bourignianism Detected*, and along with Leslie's Preface was replied to by Garden, at the end of his *Apology for M. Antonia Bourignon*, 1699. Garden twits Cockburn with his former leaning to books of a mystical tendency, such as the *Imitatio Christi*, and Scougal's *Life of God in the Soul of Man*.

74. Other evidences of the spread of Bourignian opinions in the North of Scotland are furnished in an anonymous

publication by Robert Barclay<sup>26</sup> (1672-1747), son of the Apologist; and Andrew Honyman's *Bourignonism Displayed*,<sup>27</sup> published at Aberdeen, 1710, which likewise attacks one of Garden's prefaces. Some of Mdlle. Bourignon's admirers in Scotland were of considerable eminence. It may be sufficient to refer to Sir George Mackenzie, of Rosehaugh (1686-1691), the Lord Advocate of Charles II., whose stern determination to force Episcopacy as a state religion upon Scotland has earned him the unenviable stigma of the "Bluidy Mackinyie," an appellation however by no means answering to his general character. In a treatise designed to show that the chief use of human reason is to elevate the mind to a higher reason than its own, Mackenzie instances the working of this better reason in childlike minds, "*cujus exemplum paucis abhinc annis nobis tulit Flandria in virguncula infante, septimum aetatis annum nondum egressa.*" After telling the story of her beseeching her parents "*ut se in Christianorum regiones ducerent,*" he uses this remarkable language, "*terminetur mea superbia contemptu mundi, et mea severitas in me solum se exerceat.*"<sup>28</sup> Posterity has almost taken him at his word.

75. In 1771, the ordination formula, which embraces a renunciation of Bourignonian errors, was drawn up by the General Assembly of the Kirk of Scotland. The Free Kirk, considering, as Dr. Cunningham puts it,<sup>29</sup> that the authoress of these errors is "now almost wholly forgotten,"

<sup>26</sup> *A Modest and Serious Address to the well-meaning Followers of Antonia Bourignon, upon occasion of the translating and publishing of her Warning against the Quakers, and its Preface to the English Reader. By one of the aforesaid People, with a Letter from A[ndrew] L[atray] to Dr. G. G[arden].* 4<sup>o</sup>, 1708. Smith's Cat.

<sup>27</sup> The running title is *Bourignonism Bafled*, &c. A copy is in the Sion College Library.

<sup>28</sup> *De Humanæ Rationis Imbecillitate, Liber Singulaïs*, editus a J. G. Graevio, Trajad. Rhen. 1690, 12mo.

<sup>29</sup> *Historical Theology*, by William Cunningham, D.D., 1863, ii., p. 584.

wisely substituted, in 1844, the word Erastian, as referring to a better known though entirely distinct heresy.

76. This no place to speak in detail of the theological specialities which characterised Mlle. Bourignon's teaching. Her opinions are contained in the twenty three volumes of her works, most of which have been enumerated, and of which a complete list will be found at the close, specifying as far as possible those which have been rendered into English. She was a remarkably ready writer. When she put pen to paper she wrote as fast as the hand could guide the pen, and without blots or alterations. Francken, of Amsterdam, in answer to the suggestion that the works published under her name were in reality written for her by some learned man, who made her the vehicle of his sentiments, states that "he had often found her in her little chamber, with a piece of deal board on her knees, writing without any other thing but the paper on which she wrote, and the pen and ink which she made use of, and she leaving off to write, upon discovering that he was in the room, and because she never wrote but with attention to the voice of God in the inward silence and recollection of her spirit, he would take up the paper with her permission to read it, and find it was written so swiftly, that there would be yet ten or twelve lines fresh and wet."<sup>30</sup> This ease and speed gave a flowing and unstudied character to the productions of her pen, which is itself no small charm and recommendation to them. "No other mystical writings," says Poirer, her enthusiastic admirer, "are so natural and touching as these; none so completely within reach of the simplest intelligence, and, at the same time, so full of divine mysteries, which are there laid open in their most hidden depths; witness that great mystery of the glory, beauty, excellence, permanence, and regeneration of every creature, as brought out in her Treatise on that subject."<sup>31</sup>

<sup>30</sup> *Recueil des Témoign.*, pp. 84-85. Quoted *Apology* p. 41.

<sup>31</sup> *Pref. Apologétique*, p. 85.

77. To class a writer among mystics is often simply to convey a vague slur on the clearness of his thought or the honesty of his understanding, and this in the form of a somewhat compassionate reference to his piety of sentiment. Anthoinette Bourignon is commonly and rightly classed as a mystic ; but under the general head of mystics there are comprised several distinct families, and she successively received the impress of more than one variety of mysticism.

78. The mystical fervour of Catholics is usually of that type with which the name of the Castilian Saint, Theresa à Jesu (1525-1582), is especially associated. It seems to open the other world to the vision of an enraptured heart. The society of the angelic hierarchy, and the company of the saintly host, are allowed to bring tokens of their presence to the soul of faith. The deepest mysteries of the divine being, the Holy Trinity, the Incarnation of God, are, in some marvellous way, visibly revealed to the trembling worshipper. The veil of the senses forms no barrier in the moments of this exaltation to the direct perception of those realities of which the Creed speaks. There is no tendency in this receptive and imploring type of mysticism, directly or indirectly, to weaken the reliance of its votary upon the authority of the Roman Church. Nay, it gives its doctrines a firmer hold, by making them more real. It is a safe as well as splendid exercise of the heart. St. Theresa was ever a devoted child of Catholicism ; and it was the work and intention of her life to render its discipline more strict, and its authority more tenacious.

79. With St. Theresa's writings Mdlle. Bourignon was well acquainted, though she preferred those of her coadjutor, St. Johannes à Cruce (1542-1591), as being more sublime and pure in their manifestations of detachment from men and all created things. St. Ignatius Loyola (1491-1556) and St. Francis de Sales (1567-1622) were also on her list of spi-



ritual writers, though the latter was too fluent and honeyed for her taste.<sup>82</sup> We have seen that she herself occasionally had experiences of the kind common in this type of mysticism. St. Augustine was her visitor. More than once did the glorious view of Christ's heavenly body float down to her senses from above, accompanied, on one occasion, with the vision of thousands of saints.<sup>83</sup> The effects of this kind of mystical exaltation are, however, but little seen in the calm, dispassionate writings which she gave to the world. The fantastic mysticism of rapturous visions is the offspring of a warmer heart and a sunnier temperament than hers. The souls of others were laid bare to her keen glance; their condition was revealed to her that she might warn, or comfort, or exhort. This was the office of her visionary power, far more than the immediate perception of those things which the angels desire to look into.

80. There is another type of mysticism, of which Jacob Boehme (1575-1624) is the greatest exemplar,—the mysticism to which Bombast von Hohenheim, or, as he is called, Paracelsus (1493-1541), led the way. If the word be not misunderstood, this might be termed the physical type of mysticism, for its characteristic is to look for the source of mystery and reality rather below the surface of things than beyond the sky. It is essentially a Protestant mysticism; it knows nothing of the awful pleasures which thrill the saint when the ineffable presences of Heavenly persons come to be his guests. It takes delight in exploring, by a divinely guided instinct and special illumination, the secret properties and hidden forces of matter. It is not materialistic; for it sees that all material things grow out of a spiritual ground. Its tendency in theology is to advance in the direction of pantheism, if it be not already there; and,

<sup>82</sup> *Vie Continué*, p. 557.

<sup>83</sup> *Vie Continué*, pp. 319-372.

in the religious life, to retreat from any active conflict with the sins and woes of the world.

81. After her removal to Amsterdam, Mdlle. Bourignon met with readers of Jacob Boehme, and thus became acquainted with his writings. She enumerated him with Tauler, à Kempis, and Engelbrecht, in her list of inspired and illuminated men. His followers complained that she did not understand his principles, which is very likely; it is possible that they themselves may not have fathomed the deep well from which they drank. But it is clear that she retained traces of his influence. It is very likely that from him she received that doctrine of the four temperaments which figures in the preface to her *Vertu Solide*, which teaches that "man, being made up of the four elements, Water, Fire, Earth, and Air, his natural manners are disposed in proportion to the element that prevails most in him; and by these temperaments of nature all men are of different complexions [*i. e.*, constitutions], and different manners." She boasts of having received a further illumination than Jacob Boehme, in regard to the great mystery of the origin of creation; yet the very speculation to which she appeals in confirmation of this is one which she would never have indulged, but for the influence of his views. In a beautiful passage in *Le Nouveau Ciel et la Nouvelle Terre*, she describes the first man, the true Adam, as he was before he fell. His veritable image presented itself before her spiritual apprehension, and a body, not "as we see it at present, but incomprehensibly more beautiful and more perfect, as the masterpiece of all nature, clear, subtle, agile, and transparent; its skin like Muscovy glass, its flesh like crystal, its veins like streams of rubies, its waters like diamonds, its nerves like the hyacinth;" the flavour of all good fruits its aliment, the fragrance of all sweet smells its only efflux; "all its parts, within and without, so bright, framed with

such art, that all the beauties of the universe were nothing to the least part of it. The quintessence of all natural things was the matter of which it was formed, and all nature obeyed it. If Man designed to go on the waters, they supported him; if to the centre of the earth, it yielded to him; if through the air, it was a chariot to him."<sup>34</sup> She goes on to tell us, that out of this glorious being, before the day when Eve was taken from his side, proceeded another man-like form, which was chosen to be the Godhead's special throne, which visited earth from time to time as the visible manifestation of God, and is now in heaven, the very body of Christ. In this singular theory, we see the mingled influences of both the kinds of mysticism to which reference has been made.

82. This mingling of tendencies makes it difficult to classify Mdle. Bourignon. Nor, perhaps, would she wish to be assigned any definite and distinct place among theosophical writers; certainly she repudiated most strongly the idea of founding anything like a separate sect or school. "She protested a hundred and a hundred times that she would establish no party, nor draw any after her, but send all to Jesus Christ, and to the practice of the doctrine of the gospel."<sup>35</sup> It was her mission, as a virgin pregnant with the gospel life,<sup>36</sup> to effect the regeneration of the Church, or second birth of Jesus Christ. Her writings were thus a New Scripture, as God himself informed her.<sup>37</sup> Of Holy Scripture itself, she never was a great student, believing that

<sup>34</sup> See *Apology*, p. 46, where references are given to *Le Nouv. Ciel*, pp. 44, 45, 51, 74, 92, and *L'Etoile du Matin*, pp. 3, 10. See also *Vie Continué*, p. 315. The most curious point in the description is omitted above. Readers of Bayle (*Article Adam*) will recollect it; students of Jacob Boehme will recognise the source from which it comes. It is expressly stated (*Pref. Apology*, p. 80) that while she lived in Brabant her utterances respecting the original state of Adam were in accordance with the common opinion.

<sup>35</sup> *Apology*, p. 153.

<sup>36</sup> *Par. de Dieu*, Introduction.

<sup>37</sup> *Vie Continué*, p. 347.

her illumination enabled her to dispense with it. The Apocryphal Fourth Book of Esdras, was to her apprehension the best, most divine, most clear, and most salutary of all the books contained in the Catholic Canon.<sup>38</sup>

88. It may be safely said that though she abandoned nearly every point of Catholic ritual, and held in a new sense many of the articles of the Catholic Creed, yet the Catholic ideal of religious self-discipline was the formative principle of her life. A large number of her disciples were drawn from the Calvinistic side in theological controversy; but this must, on their part, have been entirely the result of a reaction; their new instructress had not the slightest leaning towards predestination; indeed, all her theological utterances tended the other way. The pith of her moral theology may be embraced in this one maxim, "God is the only Fountain of all good, from whom never any evil can proceed; and man is the only fountain of all evil, from whom never any good can come."<sup>39</sup> The practical aim of her mission may be understood from a few words in the preface to the second part of her best known treatise. "Many took occasion to say that I had changed my religion, and was become an enemy of the Roman Church; which is not true, since, being born in it, I will live and die therein, without changing name or religion, but only my manners and my life. . . . In the mean time I offer this *Light of the World* to all good souls who seek the truth, that they may truly discern reality from appearance. For this prevails now through all the world, among all sorts of sects and religions, that almost every one cleaves to the bark and does not touch the wood, fancying that virtue consists in having a fine religious name, as that of the Reformed, the Evangelics, the Catholics. For there is nothing that saves but

<sup>38</sup> *Vie Continué*, p. 555.

<sup>39</sup> *Renouv. de l'Esp. Ev.*, avant pref., p. 22. Quoted, *Apology*, p. 8.

the love of God, and not a religion. Every one ought to hold the religion that serves him as a means to attain to this love." In accordance with this sentiment, she remarks, in the same treatise, replying to Père De Cort's enquiry relative to the salvation of good heathens, "Sir, you are ignorant yet of a great many things; for that faith which you call heathen is divine. . . . We have not a political God, who has need of the testimony of men, when he sees the essence of faith living in our inward parts. I reckon such heathens to be more saints than many of those who are canonised by the Roman Church."

84. On the whole, then, the position of Mdle. Bourignon is that of a spiritualistic mysticism, inclining to quietism on its speculative side, but in its active tendencies very alien to that resigned indisposition to battle with the ills of the world, which quietism exemplifies. She was able to do battle for her rights upon occasion, without temper, and at the same time without tamely yielding. That easy disposition, which for the sake of peace puts up with the injuries and wrongdoings of others, without rebuke offered or redress sought, she despised as a lack of virtue. Exact in her own management, and precise in her ways, she expected others to be similiarly exact and faithful. Order and regularity were instinctive with her, and necessary to her happiness; she would not allow anything to be slurred over on the plea that it was but a trifling matter. Here are the seven divine precepts for the daily conduct of her spiritual children, which she gave to them as from the mouth of God.

1. Do everything in good order and right season; for I am a God of order, and disorder is of the Devil and of sin.
2. Never be too eager in temporal matters; but direct your mind to the doing well and quickly what you have to do; for a restless and troubled mind spoils all.

8. Be careful to turn everything to account, so that nothing may be wasted or spoiled; whatever is wasted through your neglect will be demanded back of you; and what you have no need of will be of use to some one else.

4. Keep yourself always employed in useful, helpful, or necessary matters; for idleness is the mother of all evils, and the Devil makes his bed in the vacant soul.

5. Work to fulfil your repentance, and not to please men, or to gain money, or for your own gratification. For all works done with any other end except to please Me are lost labour; and your reward is no more than just what you have sought, viz., the approbation of men, the gaining of money, or your own gratification.

6. Direct your mind to the keeping of a strict watch over all things, so that nothing may perish through your neglect; and whenever you notice anything wrong apply the remedy at once, making all possible reparation for all faults you have yourself committed.

7 Do the like in regard to your neighbour's welfare; so fulfilling the commandment to love your neighbour as yourself.<sup>40</sup>

85. The simplicity and sincerity of her own character had very much to do with the spread of her principles; it was a simplicity which made itself felt throughout those principles, and, as the inscription beneath her portrait testifies, aided her to sustain

Universal reproach, far worse to bear  
Than violence. For this was all thy care,  
To stand approved in sight of God, though worlds  
Judged thee perverse.

86. The complete *Oeuvres d'Antoinette Bourignon* were first published at Amsterdam, 1679-84, in 19 vols., sm. 8vo.; again at Amsterdam, in 1686, in 21 vols. 8vo., and a third time at Amsterdam, in 1717, in 21 vols. 8vo.

The following treatises are contained in them. The dates in this list refer to the time of composition. In brackets are the titles of the English editions, with the dates of

<sup>40</sup> *Vie Continué*, p. 441.

publication. In all cases, only the leading words of the title are given.

1. *L'Appel de Dieu et le Refus des Hommes*. A Collection of Letters, in two parts. Part I., 1637.
2. *La Parole de Dieu*. 1673.
3. *La Lumière née en Tenebres*. A Collection of Letters, in four parts. Begun 1663.  
[Eng. *The Light Risen in Darkness*. 1703. 8vo.]
4. *La Lumière du Monde*. In three parts. Begun 1664.  
[Eng. *The Light of the World*. 1799. 8vo. Reprinted 1863. Abridged 1786.]
5. *L'Académie des Sçavans Théologiens*. In three parts. 1667.  
[Eng. *The Academy of Learned Divines*. 1708. 8vo.]
6. *Le Tombeau de la Fausse Théologie*. In four parts. Begun 1667.
7. *La Sainte Visière*. 1667.
8. *Sa Vie Extérieure*. 1668.
9. *Le Nouveau Ciel et La Nouvelle Terre*. 1668.
10. *L'Antechrist découvert*. In three parts. 1668.
11. *La Dernière Miséricorde de Dieu*. Unfinished 1668.
12. *L'Innocence Reconnue*. 1669.
13. *Avertissement contre la Secte des Trembleurs*. 1671.  
[Eng. *A Warning against the Quakers*. 1708. 8vo.]
14. *Les Pierres de la Nouvelle Jérusalem*, with Appendix, *Les Règles des Chrétiens*. 1672.
15. *L'Aveuglement des Hommes de Maintenant*. 1672.
16. *Traité de la Solide Vertu*. Part I., 1672. Part II., 1676.  
[Eng. *An Admirable Treatise of Solid Vertue*. 1699. 8vo.]
17. *Le Témoignage de Vérité*. Part I., collected 1673. Part II., collected after 1683.
18. *La Pierre de Touche*. 1674.
19. *Renouveau de l'Esprit Evangélique*. In three parts. Part I., 1670. Part II., 1674. Part III. (unfinished), 1680.  
[Eng. *The Renovation of the Gospel Spirit*. 1707. 4to.]
20. *Avis Salutaires*.
21. *Les Persecutions du Juste*.  
[Quy. Eng. *A Collection of Letters written [1664-1680,] by Mrs. Antonia Bourignon, upon occasion of many persecutions raised against her for the sake of the Truth*. 1708. 8vo.]
22. *Confusion des Ouvriers de Babel*.  
[Eng. *The Confusion of the Builders of Babel*. 1708. 8vo.]
23. *L'Étoile du Matin*.

## ON SOME PHASES IN THE HISTORY OF VARIOUS MILITARY NATIONS,

By BARON LOUIS BENAS.

WHETHER the maintenance of armed men, among civilised citizens is a natural or an artificial position, has been argued and debated, since almost the very existence of society. Whether again it is true heroism to lead men against their fellow-men, to slaughter and destruction, has been a question at issue between countless philosophers.

Let us strip armies of their attractive uniform, "of the neighing steed, the shrill trumpet, the spirit-stirring drum, the ear-piercing fife, the royal banner and all quality, pride, pomp, and circumstance of the affair;" and only imagine two savage chiefs seeking to butcher and exterminate each other, to burn their tents, to ruin their habitations, and to spread fire and destruction on all sides; let us further imagine that these savages, after many months of sallies, surprises, and pitched battles, smoke the pipe of peace, keeping quiet only for a time, muttering thoughts of revenge, and only waiting, for the execution of their silent threat, until the one or the other shall have recovered from his exhaustion;—if we do this, we shall find the tragedy itself resemble very much a burlesque.

In Africa we hear of a long standing feud between Oko Jumbo and Ja Ja; and of hecatombs of slaughtered human beings. What the real origin of the quarrel was, we have neither the desire nor the interest to inquire into, any more than the combatants named care to enquire about the Franco-Prussian conflict; each belligerent has that view of the



quarrel which interests himself only. The philosopher, however, whom the discovery of a new satellite would interest a thousandfold more than all the intrigues of diplomatists, or the defences and apologies of combatants, would be more likely to exclaim,

“A plague on both your houses.”

It is not the object of the writer of this paper to argue, whether, from a moral point of view, wars are just or unjust; or whether, under any circumstances, man is justified at all in taking up arms; the usage of a learned society would in any case, by its salutary banishment of politics from the subjects of discussion, prevent my so doing. There is a subject, however, of vast interest, whereupon we all can meet upon the neutral ground of history, and, reviewing accomplished facts as we find them at present, or looking back upon the various phases of history, we may strive, if possible, to cast a ray of light, however feeble, upon a possibly unilluminated by-way of literature.

We have no record of actual conflict before the flood, unless we take into account the tragedy of Cain and Abel. Very soon after the confusion of tongues, we hear that Nimrod, the son of Cush, began to be a mighty one in the earth. From the fact that the beginning of his kingdom was Babel, “confusion,” it may be presumed that it was not by peaceful means that Nimrod attained his supremacy. We next hear of Amraphel, king of Shinar, Arioch, king of Ellasar, Chedorlaomer, king of Elam, and Tidal, king of Goyim (in the authorised version this is given king of nations). These four kings, we are informed, made war with Bera, king of Sodom, and with Birsha, king of Gomorrah, Shinab, king of Admah, Shemeber, king of Zeboiim, and the king of Bela, which is Zoar. We cannot imagine otherwise than that these conflicts were little else than such as those which

take place at the present day between the aborigines of various countries; for subsequently we learn that Zoar, of which one of the combatants was king, was a very small place, and we further read that Abraham, when he heard that his brother was captive, armed his retainers, three hundred and eighteen men, defeated the entire coalition, released the captives, and accomplished his object. These skirmishes were not unlike those of the mediæval Raubritters on the Continent.

But we now come to a new phase in the military construction of a nation. The Israelites, who had grown into a powerful people in Egypt, attained their independence under divine interposition; not by the sword, but by the inspired diplomacy of Moses, a whilom Egyptian prince; but they were to obtain the land, not by purchase or diplomacy, but by direct conquest. A forty years' training in the wilderness, inurement to every hardship and trial, endless marching and counter-marching, hunger and thirst, had to be endured, before an enervated race could be superseded by a young, vigorous, healthy, moral, and well-disciplined body.

Before such an idea could be contemplated, every man from twenty years and upwards—all who could go to war—were called into requisition. The men were divided into their families, the house of their fathers, and then into their tribes; each tribe or combination seeming to be what in modern military phraseology is termed an army corps. When we take into account that six hundred thousand men, besides women and children, found their way into the desert, in addition to a multitude of followers who accompanied them, it must strike us forcibly that only a master mind could be entrusted with the direction of so huge a mass of people. Discipline was kept up by captains of tens, captains of hundreds, and captains of thousands, each prince having his individual banner, which served as a rallying point to the

masses. Thus, at the grand review before the farewell of their divine leader, so graphically described in that part of sacred writ called "Numbers," we see a march past of six hundred and three thousand five hundred and fifty, consisting of all the able-bodied men. This was without the tribe of Levi, which was exempt from military service. The care and discipline of this vast host we can glean from the fact, that the tabernacle of the congregation should set forward in the midst of the camp, and as they encamped so should they set forward, every man in his place, by their standards.

So much care, training and discipline, and so many years of preparation for a single purpose, accomplished its aim and end; and when the onslaught came, fortress after fortress surrendered, army after army capitulated, and a debauched, weakened and enervated population could make no stand against the well drilled invader, until, from utter exhaustion on the one part, and sheer force of matter on the other, the whole land was under the heel of the invader.

Thus we have an early example of how concord, unity of purpose, and discipline can overcome divisions in council and political and moral lassitude. "*Concordia res parvae, crescunt, discordia maximae dilabuntur.*"

We need go no further to show how this nation attempted to hold that which it had acquired by force; nor need we follow it through a series of judges, through its first monarch, or through the reign of that marvellous hero, who, rising from the ranks, and by a combination of great military talents, cunning, diplomacy and the co-operation of equally talented generals, carried his banners to the remotest frontiers of the land; organising an Empire which shone like a brilliant meteor through the wisdom of his son Solomon, only to be shivered into fragments through the neglect of those wholesome regulations by which the fortune of the

state had been founded. There is only one point deserving notice which will enlighten us as to the enormous masses of men that were arrayed against each other; namely, that Abijah set in battle array four hundred thousand chosen men, whilst Jeroboam brought against these eight hundred thousand likewise chosen men. In both we find the term "chosen men" used, which may lead us to suppose that there might have been a considerable reserve in addition to this, (2 Chronicles xiii.) The result of the conflict seems to have been that five hundred thousand warriors of Jeroboam were slain; figures which, with our modern conceptions of warfare, are appalling!

We can only notice, as it were in a dioramic form, the wonderful Phœnician people, who so early developed their naval resources. Touching as they did first at Cyprus, the copper island, Crete, the chalk island, they founded colonies as they went along, such as Utica, Adrumeta, Leptis and Carthage. Passing on to Sicily and Sardinia, they built cities on the Spanish main, Kalpe, the modern Gibraltar, Malaga, Seville and Gades. Penetrating further, into Britania, the tin island, and reaching as far as the Baltic coast in search of the electron or amber. Yet this nation, of whom it was said its "merchants were princes and its traffickers were the honorable of the earth;" whose wealth and enterprise had rendered them famous to the utmost ends of the world; was defeated by Nebuchadnezar, with a gigantic army; and though they re-established themselves in a neighbouring island, and regained somewhat of their ancient commercial glory, the youth of Macedon utterly destroyed them; and a large plain of sand, covered by a few fishermen's huts, is all that remains of the pomp, pride, wealth, and glory of Sidon and Tarshish.

Hitherto we have described purely national armies, but Carthage, a colony of Phœnicia, presents us, 700 B.C., with

the first example of a hired soldiery—soldiers in the true sense of the word; that is to say, men who received soldi or wages for their hire, and who adopted arms as a profession. Egypt, existing as it did from the earliest dawn of history, we find, under Psametticus, 656 B.C., employing hired troops; and the throne of the Pharaohs, in its turn, became overwhelmed by the hordes of Nebuchadnezar. The Persians, with the exception of the great national levy of Xerxes against the Greeks, employed nobles only in the use of arms; the great masses of the people were untrained to military exercises. Thus they collapsed at the first invasion of the great Alexander; whilst Babylon and Assyria have left the world nothing to be remembered of them but their colossal ruins. We turn with greater pleasure to Hellas,—fair Hellas, mother of all that was beautiful, would that we could say, of all that was good! Its mountains, are they not peopled with gods; its valleys, with heroes; its groves, with philosophers? every stone breathes an epic, every running brook gurgles a poem, every mound unearths a sculptor,

“Eternal summer gilds them yet,  
But all, except their sun, is set.”

It was in Greece that all means adapted to develop the body, and to train the mind to warlike enterprise, were first cultivated as a science. Whilst the Hebrews hated war as a stern necessity, and resorted to it only as a means of purchasing peace; with the Hellenes war was regarded as the noblest calling of man. Their early coins and medals perpetuate the memory of struggles of every description glorified; be it a combat with the lion, the bull, the dragon, with giants both celestial and terrestrial. It was by Greece that we have been taught to exalt the heroism of war above any other species of heroism. Their earliest records canonise their warriors—Hercules, Theseus, Perseus, Bellerophon,

and others. The expedition of the Golden Fleece, the first Peloponnesian war against Thebes, and the grand mythical Trojan expedition,—all these haunted the Greek, until his mind and habits were formed upon the models he had set before him.

Unlike the inhabitants of Palestine, who soon learned to forget their conquest of Canaan, but never ceased to remember their exit from Egypt, a feat accomplished by peaceful means, and by a belief in a special providence; the Hellenes would remember nothing but their own prowess and individual heroism. The *Iliad* was their Exodus, the *Odyssey* their Deuteronomy. But this system received its own punishment; for, after the great battle of Marathon, Sparta and Athens fought for supremacy, and frequently hired soldiers to carry on their wars. Thus every successful leader became the tyrant of a district, and the hired men under his sway did what they listed with the peaceful inhabitants.

With Philip and Alexander of Macedon, who with his phalanx over-ran the whole of Greece and Asia Minor, may be said to close the first part, or primitive warfare. It may be interesting to describe this phalanx which at that period was considered invincible. It consisted of from four thousand to ten thousand men, arranged in a square, armed with very long spears, men sixteen deep. The momentum of their onset generally decided an engagement. The rear ranks, that could not reach the enemy, were drawn up shield to shield, and held them upon the shoulders of those before them, thus forming a wall of protection against the darts and missiles of their opponents.

Greece in its turn becoming part of the Empire of the world, leads us on to examine the greatest military state of ancient time, which originated with the city of the seven hills. So long as Rome employed her own citizens in her defence, and so long as it was an obligation of honour on

the part of the citizens to take part in matters involving the weal or woe of the Republic, so long did Rome remain ever young, ever mighty, and ever victorious. Until the period of Marius and Sylla, the Roman armies were strictly national, and the gigantic conflicts with Hannibal were fought (with the exception of Scipio, who employed Numidian Spaniards), not by soldiers, but by the people in arms. At the period before mentioned, mercenaries came into request. The ancient laws, which enjoined upon all citizens military service, fell into disuse, and the gulf between the citizen and the soldier became gradually more and more widened, until at length the empire was ruled not by its laws, but by the favourite leader of an armed soldiery.

We may now pause to examine the successive military systems that civilised society has employed, or rather has had to suffer; they may be divided into six important divisions, namely—

- 1st, The legions of the Roman Emperors ;
- 2nd, The feudal armies of mediæval times ;
- 3rd, The invention of gunpowder ;
- 4th, The wars of Louis XIV. ;
- 5th, The wars of the French revolution ;
- 6th, The modern Prussian military system.

The copious sources of Vegetius, in his *de re Militari*, of Livy, of our own Gibbon, and last, though not least, of Josephus, in his *de Bel. Jud.*, give us ample information of the very minutest details of the Roman legions. In the brightest period of the Consulate and the Empire, the legions were chosen as in modern times,—the rank and file of ordinary persons, the leaders, men of liberal birth and education. When he entered the service, a solemn oath was administered to every soldier, by which he swore never to desert his standard, to be obedient to his officers, and, if need be, to sacrifice his life for the Emperor and the Empire.

The Golden Eagle that glistened in front of the legion was the object of the fondest devotion on the part of the soldier. The centurion had the power to inflict corporal punishment; the general, the authority to punish with death the infraction of discipline. The pay of the common soldier (Gronovius states, in *de Pecunia vetere*) was at first twelve pieces of gold, equal to about ten pounds; later on it was increased; and after twenty years' service the veteran received three thousand denarii, about a hundred pounds sterling, or an equivalent in landed property. The pay of the Guards was about double that of the legions. The Imperial legion consisted of about six thousand infantry, divided into ten cohorts and fifty-five companies, commanded by a corresponding number of tribunes and centurions. The first cohort always claimed the post of honour and the custody of the eagle; it consisted of one thousand one hundred and five soldiers, renowned for valour and fidelity. The cavalry consisted of seven hundred men and horses, divided into ten troops or squadrons. The first, as the companion of the first cohort, consisted of one hundred and thirty-two men; each of the other nine amounted to sixty-six.

The arms of the infantry were uniform, and consisted of an open helmet with a lofty crest, a breast plate or coat of mail, greaves on their legs, and a large buckler on their left arm. The buckler was of an oblong and concave figure, four feet in length, and two and a half in breadth, framed of a light wood covered with bulls' hide, and strongly guarded with plates of brass. Besides a lighter spear, the legionary soldier grasped in his right hand the formidable pilum, a ponderous javelin, in length about six feet, tipped with a triangular point of steel, about eighteen inches in length.\* The cavalry were somewhat similarly armed, but afterwards borrowed the lance and iron mace from the barbarians.

\* Gibbon.



It was, however, in times of peace that the legions continually persevered in the lessons of war, and always remained in camp, instead of in barracks, as in modern times. When they had marked out a plot of ground for encampment, they taught themselves to make it impregnable. Every hillock, every mound was taken into account; a strong quadrangle was formed, and watched on every side for fear of ambuscade. It was here that the Roman soldiers learned to use their shovel and pickaxe, which their leaders regarded as of equal value with the sword. Roads were cut in every direction. In fact, in every province occupied by the legions, marvellous remains bear witness to the activity of the Roman soldier. Leaping, swimming, carrying heavy burdens, making long and forced marches were the continual occupation of the legionaries. Need we marvel at the progress of their arms in every direction? Augustus numbered forty-nine legions, or about six hundred thousand men, including attendant auxiliaries. Hadrian had thirty legions, or about three hundred and seventy five thousand men. Three legions were usually maintained in Britain, sixteen on the Rhine and the Danube, two in Lower and three in Upper Germany, one in Rhætia, one in Noricum, four in Pannonia, three in Mæsia, two in Dacia.

The Prætorians Guard, who had charge of Italy, and were the authors of every revolution, raised up and pulled down Emperors at will, had everything in common with the legion, except a more brilliant uniform, and a most lax and inferior discipline. Their pernicious example, penetrating into the legions, frittered away the great excellencies of the Roman soldier, until the spirit and good qualities of the men had departed, and nothing but boast and swagger remained.

In the latter days of the Roman Empire, the nation lived more and more upon the reputation of its past valour,

and less upon the actual strength of its organisation ; until the white ants of corruption, indolence and luxury, had eaten away the whole internal fabric, and nothing but the shell remained. Barbarians were taken into the armies of the Empire, and the whole secret of military discipline was taught them. Returning with this acquired knowledge to their own wild fastnesses, they found abundant supplies of raw material, infinitely superior to the Roman legions in power and endurance, deficient only in military knowledge. Supplied with this, the march southward was begun, the wound was probed and ready for the operation, and Alaric and his hordes poured like an avalanche across the frontiers of Italy. Tighter and tighter did the coils of the invader twist themselves around the beleaguered foe. Rome ! the great, the mighty, the rich, the most powerful, the light of civilisation ! surely the Goth cannot dare to insult the Queen of cities with his hateful presence ! Rome still sung on, played on, and feasted on, but the Goth came ; first one avenue was closed and then another, until at last Rome was encircled in the iron grip of the invader.

“Alaric, beware !” was the manifesto of the senate. “We have within our walls thousands of men, who will sally out and exterminate your armies ; it will be war to the knife.” “Bah ! the thicker the hay, the easier it is to mow,” was the well known reply of the Barbarian. He was not to be frightened by phantoms ; rough as his own warriors were, he knew that his opponents were, if heroic, merely armed emasculated men ; and what could heroism avail against compact and innumerable masses inured to warfare ! So at length the great city, when the pangs of hunger spoke trumpet-tongued, the senators, folding their togas about them, determined at least to fall decently. Terms might be made, where arms had failed ; diplomacy might be of some avail. But no ; the stern Barbarians would have all, every-

thing. "What would you leave us then, O king?" the embassy politely demanded. "Your lives! is that not enough?" So flickered the great flame of the Empire; so tottered the great fabric of the proud city, until, falling, it shivered into atoms, while in its fall the splinters, fragments, and dust of its overthrow laid the seeds of a new society, and a new existence of mankind.

Learning, the arts and sciences were pushed aside, and with them the theory of military organisation. Hordes took the place of well organised legions; the inchoate masses of people, let loose from a central governing power, separated themselves into a German, Gallic, Spanish, and British dominion respectively. A latent force, spawned in the farthest north, amid snow and ice,—another Phœnicia,—nailed their few boards together, and, under the name of Vikings, roved about at will from sea to sea, until the Northman became a terror to every accessible harbour.

The efforts of one great man, Charlemagne, seemed to emulate the glories of ancient Rome; but, being the efforts of an individual, and not the prowess of a people, his reign, like a sunbeam, shone refulgent for a moment only, to make the night more obscure by contrast. The marvellous energy of this monarch is surprising, when we take into account the difficulty of transporting men and material in an unconstructed state of society. From Spain to Saxony, from Italy to Hungary, from the Elbe to the Ebro, from the Danube to the Po,—everywhere was Charlemagne, with his conquering hordes. How the potentates collected their armies together to accomplish their ambitious designs, it may be well to analyse. Records of those periods are so vague, so conflicting, and so little to be relied upon, that it is merely by the careful consideration of incidental circumstances that we can, to any extent, derive information. Schiller, in one of his brilliant essays, entitled, *Etwas über*

*die erste Menschen gesellschaft*, says, "Es scheint also dem gang der dinge gemässer das der erste König ein Ursupator war, den nicht ein freiwilliger einstimmiger Ruf der Nation (denn damals war noch keine Nation) sondern Gewalt und Glück und eine schlag fertige Miliz auf den Thron setzten." Schiller's deduction would seem to be that the first kings were merely successful usurpers, whom a band of roughs or ne'er-do-weels, preferring the chance of war to the toils of labour, seated upon the throne. Perhaps, as Carlyle would have it, the king was the most cunning, or the craftiest, man of his band. To reward the services thus rendered, the conquered land was parcelled out by the king among his soldiers and followers; and whatever toll, tithe, or tax he required was exacted from the occupants of the land thus awarded to them. The human beings upon that land were conveyed over to the baron, and became as much his property as the castle which he inhabited. The peasantry were allowed to enjoy the produce of the lands of which the baron had been appointed master; but only upon certain conditions of re-payment, both in produce and labour. The labour was to be performed at the option of the baron, either in tilling the soil particularly devoted to the uses of the patrician himself, or in personal service; the retainer being required to follow his master into any combat, whether with a neighbouring baron or in other and far distant lands. Thus, when the supreme monarch of the land and the various barons were induced to enter upon any enterprise which might, in their opinion, promise tangible benefit, the latter with their retainers joined the king. A prince could thus, from the number of the barons favourable to his design, compute about how many men he might count upon in the field. But in the mediæval conflicts, it was not so much the number of soldiers, as the number of armed knights, that decided all engagements. The rank and file were no

match for men impenetrable to their arms, and trained from early youth to muscular exercises. Then, a score of knights frequently made a successful onslaught upon a host of miserable peasantry. The very fear of a man in armour was sufficient to damp any spirit of revolt on the part of an ill-tempered or dissatisfied peasantry. It was thus that William of Normandy planted himself and his adventurers upon the soil of England; and the fear inspired by the prowess of his steel-encased warriors caused the people to groan, and suffer, a lot it was virtually impossible for them to alter. The satirical German poet, Heine, writes (I have freely translated his lines)—

“ Fallen are the better men,  
For the sun of the bastard now rises ;  
Armed thieves divide the land,  
And the Saxon freeman he despises.  
The lowliest scamp of Normandy  
Is lord in the isle of the Briton ;  
I saw a tailor, from Bayeux he came,  
Who with spurs of gold hath ridden.”

Two circumstances served somewhat to weaken, and ultimately to destroy, the feudal system; the first and the most important was that of the invention of gunpowder. With the bitter irony of history, the most potent shaft in the thunderbolt of war, came from the religious cell of a monk; and thus the superiority of knighthood was shattered at a single blow, for the impregnable steel-encased warrior now thought—

“ That it was a great pity, and so it was, this villanous saltpetre should be digged

“ Out of the bowels of the harmless earth, which many a good fellow had destroyed so cowardly.”

Now, the merest churl could, with a vile gun, lay low

the knight whose prowess would have scorned a host of mere villains. Hence new tactics in the art of warfare were needed, and it became necessary that knights should be leaders of armed men, rather than combatants themselves. The second circumstance was the civil wars which raged in various parts of Europe. In the wars of the Roses in England, the various barons were induced to promise their followers ample largess, and absolute liberty from serfdom, to cajole them to enlist under their respective banners, whether of the Red or the White Rose.

The numerous confiscations by the victors, and the necessity of reconciling the peasantry and the population at large to the victorious monarch, and to alienate them from a latent affection for the past order of things, led to the creation of a new state of society in England. It gave Englishmen a national feeling, instead of loyalty to a particular baron. It was thus in Germany; for the thirty years' war was a positive upheaving of society in the centre of Europe. It was the struggle of peoples and free-trading cities, of a newly found youth, against a system of passive obedience to the Imperial and holy Roman Empire. It was to crush this that Wallenstein inaugurated a system of military enlistments for men, who cared nought for the object they had to attain, but simply for the love of pay and the excitement of fighting. In the celebrated tragedy of *Wallenstein*,\* he uses these words in a soliloquy: "So once, at least, I was worth an army to you, for your troops melted before the Swedish giant. In his Hofburg, the Kaiser shivered in abject fear; for soldiers are dear, and the multitude gladly follow victorious banners. . . . Then, in your sore and needy straits, you turn to me,—to me, your helper in the time of need. Your Kaiser's pride bended low to the one he had aggrieved so bitterly. I should arise, and should fill your meagre and

\* By Schiller.

attenuated camps with living warriors; and I did it! The roll of my drum was but heard, and my name, like a god of war, echoed and re-echoed throughout the world. The plough is put aside, the workshop is closed, the tools are thrown away, and all do crowd and press on, to join the well-known banner of victory. . . . ."

This description will serve to explain the general system of recruiting the armies of the sixteenth and seventeenth centuries. For, be it the conquest of Peru or Mexico, the wars of the Low Countries, or the Spanish Armada, the followers were collected to the banners of a chief, for pay and lust of adventure, to be disbanded when the object was completed. Louis XIV. inaugurated, however, a new school of warfare. Instead of collecting an army for a certain purpose, to be disbanded after that purpose had been accomplished, he utilised the warlike spirit of the French people, and maintained a continual standing army. He caused them to be drilled in all the exercises of modern warfare, and coupled with these the tactics of the Roman legion. Favoured as he was by a galaxy of brilliant tacticians, impetuous generals, and skilful engineers, he led, as it were, a ponderous engine, which eventually dominated all the continent of Europe, entailing on other lands, and notably on England, the necessity for that which was always held in abhorrence in this country, namely, a standing army. After the lessons taught by the soldiers of the commonwealth, the tory element in this country, strange as it may appear, hated the very idea of a permanent army; the church dreaded it, the patrician disliked it, and the wealthy tradesmen looked upon it with suspicion. In fact, during the entire reigns of Charles II. and James II., there was, in England, absolutely no army, in the proper sense of the word. The previous monarchs had done as their royal brethren on the continent did, namely, had called together

men for a campaign, and dissolved them when the war was over. It was our Dutch William who presented us with the expensive luxury of a standing army; the machinery of which has remained pretty much undisturbed down to the present day. The fashion set by Louis XIV. was, *volens volens*, imitated by the various potentates of Europe, which now presented, more or less, the appearance of an armed camp, that is to say, each ruler had at hand a powerful machine with which to execute any military design.

It must, however, be understood that, at this period, an army of one hundred thousand men was considered a very large one. In fact, during the wars of the Spanish Succession, including the great battles of Marlborough with the generals of Louis XIV., there never were one hundred thousand men arrayed against each other in battle.

Almost unobserved, in the far north, amidst the great steppes of Muscovy, a latent force, hitherto unfelt in the scale of European politics, was now preparing to make itself recognised as one of the military family of the continent; whilst Prussia, emerging from a petty electorate, was girding its puny loins, and preparing an elastic framework, ready to expand into abnormal dimensions, should fortune or opportunity befriend the state. Frederick II., commonly called Frederick the Great, dared, by artful diplomacy, rare military skill, and wonderful perseverance, to engage at one time the hitherto almost invincible forces of Austria, France, and Russia. Although suffering numerous defeats, yet gaining an equal array of victories, he compelled his enemies, from sheer exhaustion, to sanction his conquest of the important provinces of Silesia. Frederick was an ardent admirer of his prototype, Alexander the Great; and was about the only commander in modern times who adopted the phalanx in military engagements. At the battle of Leuthen, which he won against overwhelming masses of



Austrians, he formed his army into an acute angled triangle, the apex facing the foe, the base as a reserve. With this army, thus formed, having only a small number of his soldiers exposed to the fire of his oponents, he pierced the enemy's centre, expanded the two sides of a portion of the triangle gradually as he continued to gain ground, and at length formed the remainder in line, to rout the general body of his foe. This accomplished, the base of the triangle, hitherto unexposed to fire, pursued the enemy and made good his victory. At the present day, the long range of guns would prevent such an arrangement, though the Prussian army still carries out a modification of that system.

But the feudal system was not quite dead in France; and when, after a succession of truly vicious, though firm and inflexible monarchs, one good and pious priuce ascended the throne, overwhelmed by the mass of evil that had been done, and bowed down by labours which preceding rulers had left undone; the storm gathered around his fated head, and, in a delirious fever, France exclaimed, "Liberté—Egalité—Fraternité!" without really knowing what meaning these words conveyed. It was vain, however, to attempt to stop the torrent; the flood-gates of anarchy were opened, and the overwhelming flood burst its banks.

" Thus a tame stream does wild and dangerous grow,  
By unjust force. He now, with wanton play,  
Kisses the smiling banks and glides away ;  
But, his known channel stopped, begins to roar  
And swell with rage . . . . .  
His mutinous waters hurry to the war,  
And troops of waves came rolling from afar ;  
Then scorns he such weak spots to free his source,  
And overcomes the neighbouring fields with violent force." \*

The revolutionary fever having begun to spread its con-

tagion to other and neighbouring lands, a coalition was formed by Austria, Prussia, Russia, and Italy (or rather the few independent states of what then constituted Italy), and all rushed to the French frontier.

Carlyle well describes it,—“Ye have roused her then, ye emigrants and despots of the world; France is roused! Long have ye been lecturing and tutoring this poor nation, like cruel uncalled-for pedagogues, shaking over her your ferulas of fire and steel, it is long that ye have pricked and filliped and affrighted her, there as she sat helpless in her dead cerement of a constitution; you gathering in on her from all lands, with your armaments, and plots, your invading and truculent bullyings, and lo now ye have pricked her to the quick, and she is up and her blood is up. The dead cerements are rent into cobwebs, and she fronts you in that terrible strength of nature, which no man has measured, which goes down to madness and Tophet. See now how ye will deal with her.”

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It was now that, for the first time in modern history, a really national army, or rather a series of armies, were raised. The cry was,

“La patrie est en danger,  
Aux armes, citoyens,  
Formez vos bataillons.”

The result was manifest when Danton cruelly exclaimed, “The coalition calls us to arms! We throw down, as the gage of war, the head of a king.”

Fourteen distinct armies were organised, numbering eight hundred thousand men, between the ages of eighteen and twenty-five; and the battles of Valmy, Jemappes, Mondovi, Lodi, Rastadt, Etlingen, Roveredo, and Bassano were the first replies to the invader. It is a mistake to imagine that

the masses which thus gained victory upon victory were a mere body of armed men. This was not so. When sergeant Hoche was promoted to be an officer, the first speech to his men was—"Comrades, you have elected me your officer. If I do not head the ranks, shoot me at once; for, by heaven, every man that turns tail before the enemy, or disobeys any orders, will receive short shrift from me." It is simply marvellous, that men, taken from the workshop and the plough, could so rapidly become soldiers; but it must not be forgotten, that the men learned the military art in the practical school of battle.

It was left for the young Corsican artillery lieutenant to teach the world a new system of tactics; and, with the excellent material at his command, we know that he appeared to the armies of Europe like "an eagle in a dovecote." A general in command at twenty-six, he threw aside the old and cumbersome system of marching and counter-marching, of laying siege to fortresses in his rear, and of carrying baggage waggons with him. He was everywhere where he was unexpected. When his opposing generals imagined that, by all ordinary calculations, it must take him at least three days to reach them, he marched forward with his men, through bush and briar, hardly taking the beaten track or royal road, and, like an unexpected storm, rushed upon his foe, broke up their centre, took but few hours for refreshment, and was after them in pursuit, until he had so worn them out that he necessarily became the victor. Whether it be at Wagram, at Marengo, at Austerlitz, or at Jena; with his great and hitherto inimitable tactics of rapid marches, and skilful arrangement of his co-operating armies, that at a given time they could converge at a single point, he came down like a sledge-hammer upon the weakest and most vulnerable point of his enemy. But, like the Aztecs in Mexico, who afterwards learned from the Spaniards

themselves, and even dared to mount the very horses that hitherto in fear they had worshipped, so the states of Europe trained their armies in the tactics of the great Napoleon, and we know the sequel. The feeblest of Napoleon's foes was destined to be foremost in the work of vengeance. After the battles of Jena and Auerstadt, Prussia lost one-half of her kingdom, and nearly all her fortresses, and entered into a treaty of peace with France, which stipulated that she would not maintain a greater army than fifty thousand men. I would here relate a circumstance I read of some time ago in a German periodical. I cannot vouch for its historical foundation, but it throws considerable light upon the Prussian national feeling of that period. It happened that Stein, one of the most honest and practical statesmen that Prussia ever possessed, was seated one day in his library, attentively reading the Scriptures, when three distinguished Prussian generals were announced. I believe they were Gneisenau, Scharnhorst, and Blucher. "What are you studying so attentively?" enquired they. "A plan that will make Prussia the greatest military power in the world," was the reply. Nothing loth to learn, they asked of the civilian minister what he meant? Stein replied; "I read in the Scripture, that every man from twenty years and upwards should be called to defend the land of Israel. Nay, I should even go so far with the Biblical injunction that, having called all men in, and prepared for war, I would, like they did of old, ask the priest and levite to go in front of the ranks, and say—'Hear! O Israel, ye approach this day into battle against your enemies; let not your hearts be faint, fear not, and do not tremble, neither be ye terrified because of them; for the Lord your God is he that goeth with you against your enemies to save you. And the officers shall speak unto the people, saying, What man is there that hath built a new house, and hath not dedicated it? let him go and return to his house, lest he die in the battle, and another man dedicate

it. And what man is he that hath planted a vineyard, and hath not eaten of it? let him also go and return to his house, lest he die in battle, and another man eat of it. And what man is there that hath betrothed a wife, and hath not taken her? let him go and return to his house, lest he die in the battle, and another man take her. And the officers shall speak further unto the people, and shall say, What man is there that is fearful and faint-hearted? let him go and return to his house, lest his brethren's heart faint as well as his heart. And it shall be, when the officers have made an end of speaking to the people, that they shall make captains of the armies to lead the people."

This, said Stein, is my programme, what think you of it? addressing his military critics. However unpractical the scheme appears, such an army must be invincible, was the reply; and at a council of war the subject was debated. The first difficulty that arose was the treaty with Napoleon, pledging Prussia not to maintain more than fifty thousand men; but Stein soon saw a remedy for that. He urged that the men should be drilled for six or twelve months, sent to their homes, and fresh ones put in their place. The other difficulty was the humanitarian character of the Biblical system. That, of course, was dropped entirely; and thus Prussia was able to muster, in 1814 and 1815—that is to say, from the disastrous year of 1806, when she utterly collapsed before the French armies—a well drilled and compact body of three hundred and fifty thousand to four hundred thousand men, which, at Leipzig and Waterloo, so materially helped to overthrow her overthrower.

This system, which, with very little alteration, has been in constant practice in Prussia since 1806, may be briefly explained, thus: Every youth at his twentieth year must present himself at the parish in which he is born, to be examined by the Physician appointed by the government. If

found to be of sound health, he must serve three years in the regular army, when he returns to civil life. Should war break out, however, he is liable to take his old place with his regiment, for three years in addition to the three he has actively served. After that period, he is liable to serve six years in the landwehr, which is an auxiliary to the line, by no means a militia, but regular regiments, with a skeleton corps of trained officers, ready to be filled at an emergency. In times of peace the soldier serves three years actively and no more, but is called out six weeks every year to the manoeuvres, until he is thirty years of age; he then ceases to belong to active combatants, and passes over to the Landsturm, who, like our militia are only to be called out in cases of an invasion in their own district.

The only exemption from the three years' service is of young men who have reached the second class in the public gymnasiums, or of those who are prepared to undergo an examination somewhat similar to our civil service examination. They are at liberty to volunteer for one year, but like the rest are responsible, until they are thirty years of age, for ten years of service in case of war. It is from this class of one year volunteers that the Landwehr officers are chosen, while the officers of the line are selected from cadets trained in various military colleges, who are in almost every instance offshoots of noble families; the officers admitting their comrades by ballot, and black-balling those with whom they do not wish to associate. The Prussians assert that our purchase system was a truly radical one; for in England, say they, once a man had purchased his commission, it does not militate against him whether his father was an artisan or a tradesman; he is admitted to mess on fraternal terms, the fact of the purchase opening all doors to him. Whilst in Prussia, though the grade of officers is nominally open to every one without purchase, yet if an ordinary "ranker"

is advanced merely in consequence of personal merit, especially in a crack regiment, his life is so isolated, and made so insupportable, that in every case he leaves the line and goes to the Landwehr, an equally efficient body, though not enjoying the social distinction of the line.

It might be imagined that, by such a wholesale system of military enlistment, Prussia would present the appearance of a vast military camp; but it is not so. In times of peace, the medical examiners are told to be very lenient, and only to select those for service who are not only perfectly sound, but who are absolutely without a single defect,—without a stoop, a squint, or even an awkward gait. The consequence is that only about one hundred thousand men pass muster every year, but they are the very choicest of the youth of the kingdom; and in ten years the country has control over a million of trained warriors. How different in France, where the army is drawn by lot, and those who draw blanks are free for ever, while those who draw a number are compelled to serve. Furthermore, the ruin of France was effected through exemption by purchase, for many a healthy, strapping farmer gladly paid 1000 francs, (£40) for a substitute, who was generally a diminutive, feeble and emaciated gamin. In many cases, the local official pocketed the 1000 francs, without even providing a substitute at all. \*

The Prussians, like the children of Israel, by their forty years' training, achieved a conquest which we to day look upon with amazement. In the commencement of this paper we began with the system of military service by men of twenty years and upwards, and in the great cycle of history

\* Since the reading of this paper, the system of Universal Military Service has been brought forward in the French National Assembly. It has been accepted in theory, but has not yet in France been carried into practice, though the party known as the left have embodied this, as well as Universal Elementary Education, in their political programme.

of four thousand years, we as children return again to the lessons of the youth of mankind. Will it be for the weal or woe of humanity if the universal military service, now taking place all over the continent of Europe be adopted? This no human mind can foresee.

But for England, is it for us to join in the universal dance of death and destruction? No, it cannot be, it need not be. Providence has defined our frontiers; and if there is one nation which more than another truly learns the lessons of humanity and civilisation, is it not dear old England? Thanks to heaven, we are not an enervated race; we are most manly; we love the fen, love the field, and love the ocean; our brawny arms and sinewy limbs show no symptoms of decay; and the ravings about a *Battle of Dorking* are like those of a delirious fever patient, who is ashamed when convalescent of the stupidity of his diseased utterances.

Did not Shakespeare say three hundred years ago, and may we not apply the same words to-day—

“Come the three corners of the world in arms,  
And we shall shock them: Nought shall make us rue,  
If England to itself do rest but true.”





## ON THE DOCTRINE OF EVOLUTION.

By ALBERT J. MOTT.

1. The strength and weakness of science must both be looked for in its axioms. Our inferences rest on our assumptions. We build on what we take for granted. And since the laying of foundations is a difficult and uninviting task, for we do not work by choice or easily where there is little light and less beauty, the most important questions in any branch of knowledge often receive the least attention. Theories agreeing with our experience are accepted as general truths, and propositions which support our theories are received as axioms, without that careful and discriminating inquiry which is far more important here than in any subsequent reasonings.

And the power of axioms over our inferences is even greater than it appears to be, for besides the direct and necessary determination of consequences immediately flowing from them, they have an indirect but not less weighty influence on the judgments we form in other matters. When in the pursuit of science all the known facts relating to a given subject are collected together, it happens almost invariably that they admit of several explanations. Several theories may be propounded, each of which may be supported by the facts themselves, if nothing else is taken into consideration ; and when we choose one of these as the true theory and reject the rest, it is because we already take for granted something which determines the choice and the rejection.

2. In those inquiries concerning the nature of living forms which have of late become so interesting, the immense

assemblage of facts, brought together by Mr. Darwin and others, has become the ground of a special inference. An inquiry, which at first referred only to the origin of species, soon extended, not only from species to genera, but from these to the greater divisions of the living world, and it now deals with the question of the origin of life itself, or at least of its chief manifestations. As usual, the facts may be interpreted in several ways. Several theories will account for them, each giving a full and rational explanation of the whole, provided that a certain something is first taken for granted. What is this something in the case of the Darwinian doctrine? What are the special assumptions by which the choice of this rather than of any other explanation is forced upon the minds of its supporters? Are they truths established beyond all reasonable doubt, so that we may properly build upon them as axioms? Any discussion to be decisive must be fundamental. The whole weight of an argument is borne by the first thing taken for granted in it; and while there is any doubt about the strength of this original link, it is waste of time to test the others.

3. Now the assumption which really underlies Mr. Darwin's theory and is the true determining element in his conclusions, is one which he himself does not define, which is accepted with equal indistinctness of outline by most of his followers, but which is known generally as the doctrine of evolution. It is involved in the phrase, "The survival of the Fittest," which sums up Mr. Darwin's theory; for "fittest" does not here mean largest, or strongest, or most numerous, or most highly coloured, or anything which admits of equally positive definition. It is a relative phrase, and it assumes the existence of an order in nature, and of a destructive power associated with that order towards everything by which it is opposed.

It means, in the first instance, that the preservation of

organic life is dependent upon conditions; and that, in consequence of this, some of its forms will be preserved in preference to others. It is Mr. Darwin's great merit that he perceived this truth together with the fact that all organic forms are naturally subject to some variation; and that he drew the necessary inference, which is that there must be a constant succession of changes in the forms actually preserved from age to age.

This is no longer matter of dispute. It is when we inquire into the nature of the law by which these changes are governed, —a step which was quickly taken, and which now absorbs all the real interest connected with the Darwinian doctrines,—that questions of vital consequence to philosophy arise.

4. It is assumed that the conditions on which the preservation of organic life depends, including of course the natural tendency to change of form, are the result of permanent laws on which the whole process hinges; that there is a natural fitness for preservation, and that changes take place in a necessary order; not that fitness is mere accident, or that one kind of change is as likely as any other. It is never supposed that sometimes jelly-fish are the descendants of men, and sometimes men of jelly-fish, but the supposed order of change is expressed by such words as progress or development. But these words represent popular ideas, not scientific definitions, and in subjects of this kind such ideas are invariably wanting in precision. The greatest difficulties arise from the employment of these terms without an exact conception of their value. Why should a change from reptiles to birds be called development, but from birds to reptiles, retrogression? And why should natural selection lead from the lower to the higher, rather than from the higher to the lower? By "higher" we do not mean simply that which *will* survive; but what then is our meaning? Modern

science, seeking to solve its problems by the sole aid of physical law, in which nothing has to be considered but matter, its states and its properties, believes it has found an answer to these questions in the doctrine of Evolution. Is the answer a satisfactory one?

5. The doctrine is commonly held in two different forms. The first of these supposes that all physical change of every kind is subject to one general law, and proceeds accordingly in one definite direction, the apparent departures from which are really only circuitous passages to the same high road. This being established, the changes which occur in the life of a single organism, or during successive generations, being physical changes, must be in accordance with this law, and their general nature may be deduced from it.

But the second, which is the ordinary form in which the doctrine is understood, does not look so far as this, but, without entering into the question of physical change in general, is content with supposing that a law of continual evolution rules at least over the changes in the world and its inhabitants.

It is of course possible to uphold either of these views; but the difficulties of the second are very imperfectly apprehended by most of its adherents.

If a general law can be established, and it can be shown that all physical changes must be governed by it, it is comparatively easy to determine what must be the nature of those changes in any group of cases, such as the facts of organic life.

But if no such general law is ascertained, then the order of change in any such group can only be proved by independent evidence.

6. And the evidence commonly relied upon here, and generally the only evidence that is accessible, is of a dangerous and seductive kind, for it consists chiefly, not of ascertained

facts, but of supposed analogies, and these generate in the mind too often a vague notion of Law which has no sound basis, and whose uncertainty is at once revealed when we ask for its rigid definition. The fact, for example, that seeds develop into plants by successive stages of growth, suggests the idea that successive generations of plants will exhibit stages of similar development. But the suggestion is unfounded, because the analogy is imperfect. The growth of a seed is a particular process, the repetition of which produces successive generations of plants. But there is no real resemblance between the repetition of a thing and the first production of the thing repeated. To put a row of objects side by side is not like the process of making one of them. And if they have produced one another, the production of each is not really like the assemblage of all. We may learn that a hundred cells will be formed in succession by a growing seed, and that the result will be a developed tissue; but it will not follow from this that the hundredth or any other generation of plants will differ from the first as the tissue differs from its germ. If the fact is so, it has to be separately proved by observation; the first case giving us no true ground for inference concerning the second.

7. A further difficulty meets us in the fact that this view of evolution does not rest on any clearly defined law, even of limited application, but only on our knowledge of Examples which are supposed to illustrate the operations of such a law. We *see* the change which occurs in organic growth, and we call this process development; but we do not state in exact terms what development itself means, apart from particular examples.

8. Still further, the common idea of evolution is not simply that of physical change. There is a mental reference both to the causes and the objects of change.

I have no doubt the instinct of mankind is right here,

and is pointing to the truth, but it is certain that a doctrine in which evolution means development, and development includes progress, and progress involves a mental valuation, an estimate of better and worse, is not only not to be expressed in purely physical terms, but is not to be proved by merely physical evidence.

9. That development is a change from the simple to the more complex, or from the general to the particular, or that it consists in the increasing specialisation of function, are common methods of defining the term. But they all fail, as the expressions of any definite and fundamental law. Simplicity is often the highest result of progress. General and particular are words of variable meaning. Functions may be very special, but very few.

10. The physical side of the subject has been examined in an exhaustive manner by Mr. Herbert Spencer. Seeing clearly the vagueness and insufficiency of the common view, his object is to find one general law by which all change is governed, and to express it in purely physical terms; and if this were possible, it would be accomplished by the words in which he at last defines the law of evolution. "Evolution," he says, "is a change from an indefinite, incoherent homogeneity, to a definite, coherent heterogeneity, through continuous differentiations and integrations."\*

These words embarrass the reader, and obscure the subject, unless the reasons for their choice are considered with great attention; but any one who will try to give an exhaustive definition of what he himself means by development, understanding that he has to describe the physical facts alone, and not the mental estimates we form of their value, will soon discover the difficulty of the undertaking, and will I think admit in the end that Mr. Spencer has at least given us a perfect statement of a comprehensible law.

\* *First Principles*, § 57. (1863.)

I shall dispute the truth of the law. I shall try to show that it is itself based on inadmissible assumptions; and that Evolution, as thus defined, is not the true explanation of the order of physical change; but I believe we cannot be too grateful for the definition itself, or for those profound chapters of which it is the culminating point.

11. Mr. Spencer's law of Evolution includes the following ideas. A mass of perfectly homogeneous matter will exhibit no differences among its parts. If it consists of ultimate atoms, they will all be alike, exactly; their distance from each other will be uniform; so will their states of rest or motion.

And if the mass, besides being perfectly homogeneous, is also perfectly incoherent; if its parts neither attract nor repel each other, but are merely inert and unresisting, no portion of the mass will have any quality or function that is not possessed by any other equal portion, or any shape, except that of the ultimate atom, until this is given it from without. This is what we mean by the absence of all development, or by chaos in a certain sense.

If then some portion of the matter separates from the rest, or becomes in any way different from the rest, this will be a first step in development. If differentiation proceeds, so that the mass from being wholly homogeneous becomes largely heterogeneous, till it consists of separated parts, differing from each other in form, quality, and function, this will be development, more or less complete.

And in this process a change from the incoherent to the coherent is as essential as a change from the homogeneous to the heterogeneous.

The breaking up of a mass of matter in which all parts were alike, into a number of portions all of which were different, would not be a process of development if each separated portion had no more tendency to hold itself



together than the mass from which it was derived. We do not say of the ocean that it develops into waves when the wind blows. To develop is not merely to divide a whole into fractions, but so to divide that each fraction becomes itself complete as a whole.

Yet, not as a whole which is independent of all besides, but as one which has a definite place in relation to the rest. The establishment of fixed relations, among things otherwise separate and different, is included in the meaning of development whenever we use that word.

These complex ideas are expressed concisely by Mr. Spencer's definition. The changes thus spoken of are changes from an indefinite, incoherent homogeneity, to a definite, coherent heterogeneity, and no other words appear to be available for stating the fact with equal brevity.

12. But before the law of evolution as thus expressed can be accepted as a true account of the order in which natural changes really occur, there are several matters of very great interest and importance which should, I think, be reconsidered.

Is it a fact that the present variety of nature as it exists around us has sprung from a former uniformity, and that all things are still tending to greater differentiation, more definite integration, and more coherent stability? in other words, to greater variety with less change?

And is it a fact that, when this occurs, or seems to occur, the whole truth apprehended by us is told when the physical changes have been described?

13. The growth of a plant is an ordinary example of what evolution means. But suppose I make an artificial plant; suppose I imitate the natural forms with great exactness, and am even able to construct, out of raw material, separate cells and fibres, and to put them together, so that my plant cannot be distinguished from a real one.

No one knowing the facts would say that this plant had been evolved out of the raw material. It has been made; constructed; manufactured; but the idea of evolution is quite different. The difference is not in the physical changes themselves, but in the cause of these changes.

When we speak of evolution, we refer to changes arising from an internal cause, not from an external one.

14. Now the idea of causation is excluded from Mr. Spencer's definition; the very object being to express the whole truth by a simple statement of nothing but physical fact. But it is manifest that this can only be done when the whole truth consists of nothing else; and it cannot consist of nothing else if the same facts must receive different names when they are the effects of different causes, unless those causes themselves can be expressed in terms of physical fact without any reservation.

15. An equally conclusive objection to Mr. Spencer's doctrine is that it necessarily supposes a limited universe, or else a limited portion existing in independence of the rest. And as the result of this, it assumes at some former period, or at some other place, the action of causes which cannot act now or here, and of which nothing is known or can be known, except the great fact that they originated all that has succeeded them.

16. In a universe infinite in extent the possibilities of difference would be infinite, and it would always be impossible to say whether any increase of heterogeneity in any given part of it were not counterbalanced by an equal decrease in some other part.

And if every material change is now caused by some previous change, there has either been an eternity of changes, or else there has been a time when change was caused by something else. If change has been eternal, evolution cannot be the general law, for it requires a fixed starting

point somewhere. You cannot go further back than to the zero of homogeneous substance. If it has not been eternal, then the question is, What other cause originated it? To plead ignorance on this point is to admit it also as to the generality of the law of evolution; for if that cause is acting now, or is able to act at any future time, it constitutes a higher law which is not that of evolution. Whatever was able to cause a first change is able to cause other changes, unless it can be shown that there is a special cause which can produce this one effect, but no other. And if a first change has been produced in one part of the universe at one time, it may have been produced in another part at another time. And if these two portions of the universe have any effect upon each other, it will not be that of the law of evolution, but of some interference with it.

17. To get rid of these difficulties we must either suppose a limited universe, with nothing beyond its limits, starting from an initial state of rest through the action of some cause which was able to produce the first change, but nothing more; or we must suppose an unlimited universe, one portion of which remains really independent of all the rest, while it goes through the process of evolution. Neither of these suppositions is credible, and it is certain that neither can admit of anything approaching to conclusive proof; but one or other of them is the positive basis of the whole theory of evolution when regarded as a general law.

An initial state is supposed in which a first change has somehow been originated, and it is thought sufficient, in order to accept this as a starting point, to admit that the cause of this first change is unknown to us, and that it cannot be any one of the physical causes now in operation.

18. But to admit this is to say that the truth of the law of evolution itself can only be known so far as it is matter of direct observation. We cannot reason from what is seen to

what is not seen, if among the things that are not seen we know that there exists or has existed a cause, which has been powerful enough to originate the whole series of physical changes, which, for anything we know, may be acting now, or may be ready to act at any moment, in a mode as exceptional and with a force as great as when it gave the first impulse to the order of Nature, and yet a cause which so entirely baffles our scrutiny that not only its own essence, but the time, the occasion, and the manner of its action are all utterly unknown.

19. What is wanted is a law which, being granted, either accounts for the beginning of change, or else requires no beginning, and this is precisely what evolution fails to supply. It stands thus at a manifest disadvantage if compared with the hypotheses of the eternity of matter and of motion on the one hand, or the activity of intelligent power on the other. Granted that matter has always existed, and has always moved, and continual change is the consequence, but it cannot be continual evolution. Granted that matter and its changes are dependent on a living mind, and evolution becomes possible as a fact, but impossible as an explanation.

20. Leaving now the doctrine of evolution considered as a general law, and turning to such examples of it as may be really known to us, the matter chiefly in debate may be reduced to two principal questions, as follows—

Is it true that the universe visible to us has been evolved from a simpler form of matter? And is it true that the living inhabitants of this world have been evolved from simpler forms of life?

The first of these questions would perhaps hardly have arisen at present, if the nebular hypothesis had never been propounded, and the very remarkable position of that theory in relation to modern science must be considered here.

21. The nebular theory supposes an original chaos of matter in a vaporous form. From such a chaos it is conceivable that suns and systems might arise through the action only of motion and gravitation. It has been argued that such a result would necessarily follow; but this cannot be admitted till more is known about the causes and effects of heat under such circumstances.

Now, what are the grounds on which such a theory can be entertained?

The positive grounds are of the most shadowy kind. Before the *nebulæ* were resolved or the spectroscope invented, there was some appearance of proof that worlds were really forming as the theory supposed; but even then the general inference was unphilosophical. If it were a fact that stars really grew thus out of nebulous matter, all analogy would lead us to expect that they were always growing, and that nebulous matter was always being formed afresh; not that it was formed once for all as the seed of a single crop which was never reproduced. And this expectation being improbable in its nature, since there is no apparent way in which solid worlds can be re-converted into vapours except by some catastrophe, the whole theory should have been held defective on this ground, and the *nebulæ* regarded as more probably the exceptional results of such catastrophes than the common forms of matter growing into worlds. We know at present that most of the supposed *nebulæ* are stars already, and that, though the spectroscope still detects masses of gaseous matter in the depths of space, it is not, as far as our knowledge goes, the matter out of which the existing worlds could have been formed. The suggestion that such matter may yet be there in the form of meteoric stones, and that these, by their collisions, may supply the heat by which the gases are rendered visible, is, I think, unsupported by observation, and includes a serious difficulty as to the causes of such

collisions. They can only be accounted for by motion in conflicting directions, or by gravitation towards particular points. The first is improbable in the same system of bodies to the extent that would be required; and the second needs large attracting masses, in order to generate the necessary speed. It seems at least as probable that light in these cases is caused by physical changes of other kinds, among which it must not be forgotten that the interstellar ether is a boundless atmosphere, in which there are doubtless currents as well as vibrations, and that the effect of these in their passage over grosser matter has yet to be ascertained.

22. If astronomy fails altogether to furnish proofs of the nebular theory, the failure of geology is quite as conspicuous. No rocks are known to be older than the lowest of the sedimentary series, and these both in their structure and their fossils give positive evidence of a state of things very like the present on the surface of the earth. They could be formed neither in ice nor steam, and the superficial temperature was therefore, even at that remote period, between that of freezing and boiling water; a range so small as to be really of no importance in relation to great cosmical changes. The reasoning by which the shape of the earth was supposed to give evidence of former fluidity has been shown to be mistaken, or at least inconclusive; and there is in fact nothing known about the crust of the earth which might not be the result of existing agencies acting on the existing material. Of that which is below the crust, the little we really know affords no definite indication of its origin or its history.

23. A theory so destitute of any real evidence in its favour should, one would have thought, find little favour in the eyes of modern science, which prides itself so much on the experimental basis of its conclusions; and yet the nebular hypothesis is still accepted in a tacit way as the natural explanation of cosmical phenomena. This is seen especially

in the ready acceptance of the idea that the existing worlds are bodies which have once been hotter, and are gradually cooling.

The justification of such an inference, of which there is no experimental proof, must depend on the completeness of our knowledge as to the sources from which heat radiated into space can be restored. But our knowledge on this subject, instead of being complete, is in the last degree rudimentary and uncertain. What becomes of the undulations of radiant heat; what is the effect of sidereal motion through the atmosphere of space; what are the currents of that atmosphere; at what incredible speed they move, or how they vibrate while they sweep perhaps through solid worlds as the wind through trellis bars, are questions we cannot answer. Nor is it possible that they should be answered fully without determining first the insoluble question as to whether the visible universe is finite or infinite in extent. For if it is infinite, the influx of new force to any particular part of it may go on for ever; and if it is finite, the ultimate effect of all forces must depend on the nature of its boundary walls.

24. The theory of gradual cooling may be assailed also on much more limited ground. It is highly probable that when our sedimentary rocks sink to a certain depth below the surface, they become changed not only by the higher temperature of the interior, but by chemical action to which that temperature gives the first impulse, and by which fresh heat is often generated to an unknown degree. This heat represents the transference from the surface of chemical forces which have been accumulated there. This accumulation is the result of other action, chiefly that of the sun, but also in some degree, the extent being quite unknown, of the other bodies in space, and of the atmosphere of space; for it is inconceivable that these should be without influence

upon the chemistry of the earth's surface. We know, for example, that the stars emit chemical rays. The amount of heat due to these causes cannot be estimated; but, as the alteration of rocks below appears to keep pace with the deposit of fresh strata above, it may be proportional to the chemical and other forces by which disintegration and the re-arrangement of sedimentary matter are produced. It is evident that a certain temperature may thus be kept up permanently at no great depth in the crust of the earth, whatever be the condition of its interior, the process being simply the continued transfer from the surface of fuel continually prepared there by the action of external forces.

25. The importance of chemical action as one of the sources of cosmical heat seems liable to be underrated by contrasting it with the much greater effects of motion at high velocities. The heat produced by the collision of bodies is, however, generated chiefly upon surfaces, from which rapid dissipation follows, while chemical action may go on in the interior of great masses, where the loss of heat is slow, if the gain is small.

If, according to Sir William Thomson's calculation, the combustion of the whole mass of the sun might produce as much heat as he radiates in five thousand years, it will follow that the heat which the earth annually receives from the sun would be generated by burning a few inches in depth of the earth's outer crust. It is not likely that the heat produced by chemical change in the earth's interior is nearly equal to this; but then a far smaller amount of heat, if generated at some twenty or thirty miles below the surface, would supply the annual loss by conduction and radiation.

26. Other powerful agencies have also to be considered. Heat passes rapidly from the sun to the earth, but is stopped at the earth's surface without affecting the interior; but magnetism and electricity operate through solid matter



perhaps as quickly as through ethereal space ; and whatever influence is poured upon us in these forms from without, or changed into these forms on reaching us, may be felt at once to any depth beneath us. And as these are known to be powerful decomposing agencies, under a great variety of circumstances, there can be no lack of means for the changes necessary to bring about the evolution of internal heat by chemical re-combination. A perpetual flame could be kept up from a few drops of water alone, by the help of an inexhaustible battery.\*

There is no reason why the solar heat should not be maintained in like manner, except that we do not at present see the source of the external forces which must be acting upon the sun as causes for the effect. The idea is set aside by modern physicists, but apparently on insufficient grounds. The thermal effect of combustion at the earth's surface is the basis of the calculation ; but it may be, and probably is, very much greater in the sun ; and the burning of matter equal to the whole mass of the sun might really take place even on his surface, or in his atmosphere, in no great length of time, if the same material were burnt over and over again very rapidly, as it is, though of course slowly, on the surface of the earth. The five-thousandth part of the sun is only

\* I am aware that these specific suggestions may be objected to on practical grounds, the question depending greatly on the form and quantity in which certain elements descend below the surface, and on the real conditions of terrestrial electricity at a depth of several miles. But these are matters on which our knowledge is very small. My object is to lay stress upon the fact that the earth is acted upon by external forces, sufficient in themselves to maintain its temperature, so far as this is really known to us, provided only that the action of these forces can be transferred from the surface to a certain depth within the crust. Geological subsidence, chemical change, and electrolysis taken together, furnish means for such a transfer, and we are not at present in a condition to say that this is less probable than a theory of original incandescence which cannot be accounted for, and of subsequent cooling which is unsupported by proof. In some views of the nebular theory, it seems to be forgotten that a high temperature could not be obtained by a slow process, the dissipation of heat beginning always at the moment of its development.

equal to about thirty miles in thickness of his outer crust. If the thermal effect were thirty times as great as has been assumed, the annual decomposition of a superficial layer one mile thick might supply the fuel. There are no definite reasons for assuming that this occurs, but there is no extravagance in the supposition, considering the proof we have of violent action in the sun's atmosphere. That atmosphere itself would furnish more material than is here required. Whether this could happen or not depends solely on the nature and amount of the external agencies operating upon the sun; and on this point we are far too ignorant to come to any sound conclusion. As, apart from gravitation, the whole influence of the sun comes to us in nothing but ethereal vibrations, an equal influence could be conveyed to him by similar means. As we should know nothing of his existence if all these vibrations were, as many of them are, a little slower or a little faster than those which enable us to see; as there may be dark suns as well as bright ones, with influence only the greater for their darkness,—for it is not light, as light, that produces chemical change,—it is much too soon to take for granted that the external force required cannot be in existence because we have not yet discovered it. Its existence, on the contrary, must be probable in a high degree. Those movements of the air by which sound is conveyed have an extremely small effect upon anything except our ears, while the total sum of atmospheric influences is nevertheless enormous. In like manner the mere conveyance of light and heat is sure to be a most insignificant part of the whole ethereal agency. We do not sufficiently consider what has been admitted when the existence of this universal and prodigious atmosphere, palpitating throughout the inconceivable abyss of space, is once assumed.

27. Suppose the nearest stars to be at a distance of twenty billions of miles from us. That will be the diameter

of a celestial sphere in which our sun is the principal and central body. The cubic contents of that sphere will be ten thousand million billion times the bulk of the sun.

If the sphere were filled with ether, of the density of common air, which is about a thousand times less than the sun's density, it would contain matter equal to ten million billion suns. If the ether were a million times thinner than the air, there would still be the substance of ten billion suns diffused through this hollow space. Now any substance a million times thinner than air might be as unknown to our senses as the ether is, and yet, even if it is almost inconceivably thinner than this, we are led to the startling result that the mass of the ethereal matter may exceed that of all the solid worlds in an overwhelming degree. And we must remember that the thinner we suppose the ether to be, the greater is the difficulty of accounting for its physical effects. For these effects, as seen in heat and light, are regarded strictly as results of its action as moving matter; the smallness of the density being compensated by the rapidity of the motion. We are obliged, therefore, to think of the sun, not as existing in empty space or as cut off from physical contact with any large mass of moving matter, but as in an atmosphere to which there is no known limit, of which the total mass is practically infinite, and by the movements of which, therefore, any amount of mechanical force may be exerted upon him from without during any length of time.

28. A distinct protest must here be made against the habit of dismissing as unscientific all views of the universe which involve the idea of perpetual motion in it. It is not true that those who entertain these views fall into the error of the men who think a clock can be made to wind itself up. Perpetual motion is impossible in any human machine, simply because there must always be in it some point or other at which limited power is exerted against unlimited

resistance. Of course, sooner or later the power is overcome. But a fire might burn for ever if the supply of fuel were infinite, and a wheel might revolve for ever if there were any limit to the friction. It is because no bounds can be assigned, either to the universe or to the power residing in it, that the necessity for supposing any end to its activity is denied.

29. Notwithstanding both positive and negative reasons against its acceptance, there is still a fascination in the nebular theory which men of the highest scientific attainments are unable to resist. It is not too much to say that Mr. Spencer's doctrine of evolution is positively founded upon it, coupled with the further assumption that the earth was once a molten mass which has cooled into its present condition. Mr. Spencer is indeed quite aware that the nebular theory is a mere hypothesis, and he does not disguise this in the least degree; but he uses it again and again as an illustration of his doctrine; and he treats as an ascertained fact the original molten state of the earth, which is really a portion of the theory, though it is erroneously supposed to rest also on geological testimony.

The truth is, that the theory in question is absolutely essential to the evolution doctrine. If the visible worlds have really been formed in this way, that doctrine, as a general law, possesses a starting point which with it is a necessity. But if otherwise, then it has no starting point; the whole starry firmament exists without its aid, and it dwindles at once from a great law to a question of subordinate arrangement.

30. To the question, therefore, Is it true that the visible universe has been evolved from a simpler form of matter? the real answer is, that we do not know; and that any theory by which the possession of such knowledge is assumed is unphilosophical.

81. The answer to the second question, Is it true that the living inhabitants of this world have been evolved from simpler forms of life? is supposed to rest upon much more solid ground. It is accepted generally as an established fact, that the simplest forms existed first in the world, and that, from some cause or other, there has been a regular succession in the advent of higher organisms; and as the doctrine of evolution it is thought would perfectly account for such a fact, while other explanations are unsatisfactory, the inference in its favour is accepted as conclusive, so far as the production of living forms is concerned.

82. Now there is only one source from which any real knowledge as to this order of succession can be obtained. That source is the geologic record: the Testimony of the Rocks; and there is at first sight a difficulty in approaching the subject from a non-professional point of view. And if what I have to say depended in any degree upon technical knowledge, I should not attempt to say it. But the question in debate is really a question of correct reasoning, not of correct investigation. I shall not have to dispute a single fact attested by any sound geologist; but, accepting all the facts on which they base their conclusions, I wish to call attention on general grounds to the nature of the inferences.

83. Does it follow that the different orders of life now existing have appeared one after another at successive periods, because we have found their fossils in a descending series, in which the higher forms drop out step by step as we pass from the newest strata to the oldest? That is the real question in debate.

84. What is a fossil? It is a dead body which has been petrified in its grave. On finding such a body we do not learn where it lived, or even where it died, but only where it was buried. From the nature of rock formation, it must, with rare exceptions, have been buried under water

in order to become petrified. Land animals in general are not buried under water, except when they are drowned. The number of deaths by drowning is considerable in the aggregate, but extremely small in comparison with the deaths from other causes. When land animals are buried under water their bodies are rarely spread over large continuous areas. Fresh water channels, bogs and lakes, are the usual places in which they are drowned; and, if carried out seaward, they settle in the deltas of rivers. Their burial in the sea itself is a rare occurrence. In dredging operations, the remains of land animals are scarcely ever found at a few miles distance from the coast. Their fossils in marine formations, therefore, will not only be always few in number, but will be deposited in merely thread-like lines, following the contour of the land.

85. There is another most important circumstance connected with the burial of land animals under water. Whenever this occurs, as it usually does, in fresh water, it is impossible that the burial place should come to be much below the surface without first undergoing the risk of disturbance and destruction. For before this can happen the land must sink; and as it sinks it must come under the action of the waves and tides of the sea; and as at this period there will be no great depth of deposit over the buried forms, while what there is will be comparatively loose and moveable, having undergone no pressure, the greater part will necessarily be washed away, and what is left will not illustrate the rule, but the exception.

The case of marine deposits at the bottom of the ocean is altogether of another kind. There, whether the ocean bed is rising or sinking, the forms, if once buried, may be covered by beds of enormous thickness, formed under enormous pressure, before there is any chance of their being disturbed; for the danger does not occur till they rise to

the surface of the water or sink to the region of subterranean fires.

36. It follows that there is a broad and fundamental difference in the nature of the geological record concerning the inhabitants of the land and the inhabitants of the sea.

The fossils of land animals, even near the surface, must always be comparatively few in number, special in locality, and distributed in narrow lines; while at any considerable depth below they must necessarily be far more rare, and their lines of distribution must be broken and obliterated to an enormous degree.

The fossils of marine animals, on the contrary, must be formed in prodigious numbers; must be spread over vast areas; and must be found in beds of immense thickness, which no waves have been able to disturb.

A similar distinction, though of less extent, must be drawn between the inhabitants of deep seas and those of shallow water, for shallow water as a burial place has special characteristics, which more or less resemble those of lakes and rivers. It is obvious that the remains of amphibiae and of fishes will be found in special localities, comparatively narrow in extent and variable in continuity; for though they may be buried to a great depth in a subsiding ocean bed, this can never be the case where the bed is rising.

37. All this is familiar to geologists, but what is the true inference to be drawn from the facts?

Their actual substance is as follows:—

Shells, and other low forms of marine life, such as exist in oceans, must be by far the most numerous fossils in the world, and they will be especially so, compared with others, in the rocks which have been deepest below the surface.

Fish and amphibiae will be the next in frequency, and will be frequent at considerable depths. Land animals will

be the rarest everywhere, and, in comparison with the rest, will be extremely rare, except in superficial deposits.

And the necessary inference is that our chance of finding the higher forms of life will grow less and less as we go deeper down, and that our chance of missing them altogether will of course become greater and greater.

And if we find, as we do find, the actual fact correspond with this expectation, what ground have we for attributing such a result to a new and special cause?

38. The only real ground is this.—Notwithstanding the certainty that the general order of frequency will be as stated above, it is equally certain that in exceptional cases all forms of life existing at all periods will be preserved as fossils, and if it is found of any particular form that before a given epoch it has never been preserved, the reasonable inference is that it had no existence.

This is sound reasoning if we know the fact on the truth of which it depends. But it is here that the law of chances and of averages needs to be far more carefully considered, and all the warnings of cautious men as to the danger of relying upon negative evidence have been insufficient to preserve modern science from most illogical generalisations.

39. Let us consider a very simple illustration. The surface of the earth is about two hundred million square miles in area. Suppose that at twenty yards below the surface a million human bodies in a fossil state are lying, pretty equally distributed over the globe — what chance have we of finding one of them? There will be one in every two hundred square miles, which is about the size of the Lake of Geneva. If we examined any such area, twenty yards under ground, we ought to find one of these bodies. But then what approach to any such examination has ever been made? Our geological knowledge is of vertical sections,



not of horizontal areas, and though these sections tell us almost everything of that which is itself continuous, they tell us almost nothing of that which is occasional and rare.

It is because the fossils of certain forms of life are not to be reckoned by millions only, or by any other conceivable number, but are profuse enough over spaces wide enough for almost any section to expose some of them to view, that we have such positive evidence as to the eras in which they lived; and it is only where there is reason to expect a similar profusion that the absence of any fossil form, in any field of our researches, can give the least ground for inferring that there was no such form at that era of the world.

40. The fact that the value of negative evidence on this point depends absolutely and solely on our assurance that fossils of the form of life in question must have been thus abundant, if the living creatures existed, seems to be entirely overlooked.

41. There is a vague general idea that nothing important can have been left unseen, when an active search has been made in any particular direction by a number of skilled observers. And this is true within the field of observation; but the question is, What field has really been examined, and what is its real extent?

In the foregoing illustration, where a single human body is supposed to lie at a certain depth in every two hundred square miles of area, it is clear that almost any number of vertical sections might be made without exposing it; that in fact the chance of our ever seeing it by means of such sections would be almost infinitely small, while even this infinitesimal chance would be still further reduced by the probability that, if it happened to be laid bare, it would be in some inaccessible or inconspicuous place, or would be destroyed by natural causes, or covered up again, or concealed by vegetation, before anyone began to look for it.

And yet there would be no spot on the earth upon which a man could stand without having one of these dead bodies of his ancestors within a few miles of him.

42. Let us look at the matter from another point of view. It is a general law of nature that as the scale of life ascends the births become fewer, the life is longer, and the number of deaths is therefore smaller in any given time. There are of course exceptions, but there is no doubt as to the common rule, and it follows from this cause alone that the higher the form of life, the less chance we have everywhere of finding its remains.

But even this chance is diminished much farther by the additional fact that the higher animals are the least in danger of being drowned. Their habits of life, their physical strength, and their superior instincts protect them against innumerable accidents which are fatal to lower forms, and when they are not devoured as prey they die generally in places of their own choosing.

I must call particular attention to the way in which the numerical law of chances operates in the search for objects, when there is any great difference in their numbers over any given space. Suppose that in a certain bed there are in every square yard a hundred shells and one bone. Both these organisms will of course be found with certainty if any square yard is searched. Specimens of one will be much the more numerous, but both will be there. Suppose that by destructive agencies the numbers are reduced one-half. There will then be fifty shells in every square yard, but only one bone in two square yards. In consequence, if any square yard is searched, we are certain to find shells, but no longer certain to find a bone. Let the destruction go on till there is only one shell in every square yard, and therefore only one bone in a hundred square yards. If we now search as before, we are still certain to find a shell, but the chances

are one hundred to one against finding a bone. That is to say, the probability of finding a shell has not been affected, while that of finding a bone has diminished a hundred fold.

This represents precisely the reason why the lower forms of life are still found easily in the lowest strata, while the higher forms rapidly disappear. They start with an immense disparity in the numbers first preserved as fossils, and the result is inevitable.

43. All lines of reasoning lead thus to one conclusion. It follows necessarily, from the conditions under which fossils are formed and preserved, that the higher the form of life the more difficult it must be to find it as we go deeper down.

44. I am to a great extent repeating the reasoning of Sir Charles Lyell, whose works are a perpetual warning against the siren voices of negative evidence; but there can be no greater proof of their power over human nature than the manner and degree in which he himself yields to the common fascination.

"We have been fairly led," he says, "by paleontological researches, to the conclusion that the invertebrate animals flourished before the vertebrata, and that in the latter class, fish, reptiles, birds, and mammalia made their appearance in a chronological order, analogous to that in which they would be arranged zoologically according to an advancing scale of perfection in their organisation."\*

But he has in fact just shown that the inference is groundless. We should be fairly led to it only if it were a fact that where no fossils have been found, no living creatures are likely to have existed. But the true fact is, that where no fossils have been found no living creatures are likely to have existed, *whose bodies would be buried under*

\* *Principles of Geology*, 10th ed. vol. i. p. 165.

*water, in great numbers, over large continuous spaces, under circumstances which would insure their turning into stone.*

Inferences based upon this fact are perfectly sound, and are the legitimate results of negative evidence; but I need not point out the vast difference between this and the current reasoning.

45. The truth is that Geology has been called upon to do what it cannot do. It has been called upon to prove that certain things did not exist at certain periods, while the means of ascertaining such a fact are wholly insufficient for the purpose. It is conceivable that they might be sufficient. If, for example, it could be shown that at any given epoch the food, the atmosphere, or the general conditions of life which are necessary to any particular form of it, were absent from the earth. But this is precisely what Geology fails to do. It cannot point to any period in the world's history, since it has been inhabited by living beings, at which it was manifestly unfit for any one of the forms of life known to us at present. When conditions involving such unfitness have been suggested, such as a universal ocean, or a highly carbonised atmosphere, they have been set aside by fuller knowledge and more careful consideration. There is not, on geological grounds, any reason why the highest animals, or even man himself, might not have lived when the lowest stratified rocks were formed.

46. The reasoning based on the extinction of species, from which it is inferred that no animals exactly like those of the present day could have existed at that distant period, is doubtless sound. But it is liable to be very misleading. For what is meant by change of species? It is a change in details of structure which are not essential parts of the general form. The shells of the older rocks differ thus from those of our own shores. They are not alike in detail, but they are all shells; fitted for similar animals leading similar

lives in the same element. The form of life is not altered ; the change is only in the particulars of living. The creatures of former days lived to the same purposes as those of the present time, and the fact of difference in physical shape and structure is not a ground for inferring that there was less variety or less completeness in the animated world, but rather that our views of life must be enlarged by the knowledge that the same living purpose can be attained, not in one way only, but in many ways.

47. The error of endeavouring to prove by negative evidence more than in its nature it is capable of proving, has had one inevitable result. The history of geology in relation to Life has been a history of the constant putting back of dates believed to be established.

Since the year 1818, the era of Fishes has been pushed back from the Carboniferous strata to the Silurian ; that of Reptiles, from the Permian to the Carboniferous ; that of Birds, from the Eocene to the Oolite ; that of Mammals from the Eocene to the Trias ; that of Insects, only in 1865, from the Carboniferous to the Devonian. What reason have we for believing that this process is completed, or that we have come to the earliest date at which any one of these orders of life will be found ? There is positively no reason. On the contrary, it is certain in every case that similar animals must have existed for an indefinite period before the time indicated by the fossils hitherto discovered. The process of discovery will assuredly go on, and will continually go deeper, and as in the last fifty years, so in the next, every existing date will be altered by the same course of inevitable retrogression.

48. But suppose all the chief orders of life to be thus traced back at last to the lowest fossiliferous strata. They will of course still have had a previous history, but what will be the nature of the geological evidence concerning it ?

All that has been taken for evidence will suddenly vanish, exactly as that supposed to be furnished by the nebulae, as to the history of suns and planets, vanished when those nebulae were resolved into groups of stars.

49. Now to assume that this will never be done is unphilosophical, unless there are conclusive reasons for it, and it is equally so to use the doctrine of evolution itself as a reason, unless its truth can be proved without the help of the geological record. We cannot say first that the orders of life *must* have succeeded each other, because evolution is known to be the universal law; and then that it is known to be so, because the orders of life *did* succeed each other.

50. Yet apart from this, what are the conclusive reasons? What are the grounds on which we can say that any one of the chief divisions of the animal or vegetable kingdoms could not have existed before a given epoch? What line, for example, can be drawn for vertebrates generally? What for mammalia in particular? And in the latter case, what is to be said of the reasoning which infers that the higher and larger mammals did not exist before the mesozoic period, because our absolute ignorance on the subject is broken by the discovery of mammalian remains in the oolite and the trias, these remains being very few, very small, and probably marsupial? Such discoveries have been purely accidental; and they have been made at two or three spots only in the whole world. They prove of course incontestably that animals of this kind did exist in the oolitic and triassic periods, but as to what did not exist, they not only prove nothing, but they give no ground whatever for any inference on the subject. To refer to them as if the probabilities of the case were in any degree affected by them, is to bring discredit on the very principles of inductive science, in which a clear perception of the difference between facts which do not oppose a theory and facts which support it,

is one of the first things necessary to the attainment of knowledge. I believe this is heresy, but I am sure it is truth.

51. The only plausible ground for inferring from our present materials that the higher mammals are not likely to have existed in the palæozoic age, is the general absence of cetacean remains among the more ancient fossils. It has been argued with great emphasis by Owen, and with somewhat less decision by Lyell,\* that if the mammalia flourished in former days as they do at present, there would doubtless be then, as now, mammals in the sea; and that in this case, as they are numerous, large, and widely distributed, their remains would be abundant in marine formations, where the fossils of land animals might be wholly wanting, or very rare. As, however, they have not been found even in the secondary rocks, it is inferred that they could not have existed in those periods, and in consequence that the mammalia generally must be supposed to have been absent from the world.

52. This reasoning has been accepted as conclusive, and yet the first appeal to experiment has shown it to be valueless. In the recent dredging operations conducted on board the *Porcupine* in 1869 and 1870, no cetacean remains were brought up by the dredge. The experiments were made in the Mediterranean, where dolphins are specially abundant, and in the North Atlantic, where there are plenty of whales and porpoises; and the fact that the bottom of these seas may now be dredged for months without yielding a single bone of any of these animals, really annihilates the whole argument concerning the ancient mammalia. It proves, in the most decisive manner, that where the cetacea do actually live and flourish, they do not strew the bottom of the sea with

\* Owen, *Palæontology*, 1860, p. 408. Lyell, *Principles of Geology*, 10th ed. 1867, vol. i., pp. 163-165.

bones in such a manner that they are readily discoverable. The reason why they have not been found is not, of course, because none of them are there, but because they are too few in number or too limited in distribution to give us much chance of meeting with them by drawing narrow lines across the areas on which they lie. If this is true now, it has doubtless been true always. The vertical sections by which the contents of the rocks are laid open to us are exactly analogous to the furrows of the dredge ; and there is no more reason in the one case than in the other for concluding that the living beings must have been absent because their skeletons have not been found.

53. It would seem, indeed, that if the facts could have been considered beforehand, without any theoretical bias, the cetacean argument against the antiquity of the mammalia should never have been used. The question is a purely numerical one. If a hundred thousand dolphins lay entombed at the bottom of the Mediterranean, there would still be only one to every seven square miles ; and the chance of finding one would be extremely small. It is not thousands, but millions of millions of objects that are needed, in order to strew great ocean beds so thickly and so generally that they cannot well be missed if a search is made.

But fossils are the records of death ; and the number of deaths is determined absolutely by the number of births. Cetaceans in general are only born one at a time, and at considerable intervals ; and if we contrast this rate of reproduction with that represented by the myriads of eggs in the roe of a single fish, or by those Bohemian rocks in which every cubic inch contains the fossil remains of forty thousand millions of living animals, it will be evident that, among the inhabitants of the sea, the comparative number of the cetacea is almost infinitesimally small. We notice them, not because of their number, but because of their size ; but size,



instead of increasing the chance of preservation, decreases it to an enormous degree. The one essential condition in the formation of every fossil is, that the organism should be securely buried before it is decomposed or disintegrated, and in such a manner that it may not be afterwards disturbed. It must be generally impossible for this to happen with the bones of large animals lying in deep water, where the rate of deposit is very slow. Even if they resist all destructive influences for a sufficient length of time, which is very improbable, they are still for many ages in constant danger of being disturbed; for the unburied parts are exposed to the action of currents, and of moving animals, and to the collision of other bodies; and if at any moment, from any of these causes, they are uprooted from their partial burial, the whole process has to begin again.

And when these bulky animals die they usually float, either immediately or after decomposition begins; and to float is to be carried by the prevailing currents, which set in definite directions, and of which the tendency must be to drift such floating bodies to special places of deposit, either on coasts or shoals. Their general distribution over great oceanic areas would be rendered impossible by this cause alone; and even the dropping of their teeth by the way would be exceptional, for such carcasses hold together for a considerable time. This consideration applies more or less to all swimming animals, and no doubt explains the fact that their fossil forms are not found generally distributed like those of shells, but usually in special beds, where a number of them lie together, as we might expect them to do. The question whether an animal dying in the sea will sink or float is of the utmost importance in relation to the geological record.

It appears, then, certain on every ground, that if cetacean animals lived in the ancient seas, their fossils would be

comparatively few in number, and would not be generally distributed ; and it follows immediately, with all the force of positive demonstration, that we have no reason whatever to infer their absence, and hence the absence of other mammalia, during any former epoch, merely from our failure hitherto to find their remains.

54. The facts concerning the cetacea deserve special attention, inasmuch as the argument I have just examined is the only direct answer which has been given to the fundamental objection against the use of negative geological evidence in the case of land animals. That it should have been accepted as a satisfactory answer has, I think, been unfortunate for science. An objection which is really fatal to the common theory of development has been supposed to be removed by it ; and facts, concerning which we are totally ignorant, have in consequence been taken for granted.

55. But if we cannot learn from Astronomy the manner in which the worlds were made, or from Geology the order in which life appeared, what is the scientific basis of the doctrine of Evolution ?

56. That particular forms of being are constantly evolved around us ; that the growth of plants and animals is the very thing we primarily mean by development ; that there are many analogous processes in social, political, and mental phenomena ; and that it is quite reasonable to infer a general law from a number of particular examples, may all be granted. But then, what do these examples teach us ? The first condition of material growth is an equivalent amount of material dissolution. We do not find simple elements building themselves up into complex structures ; we find structures, complex already, appropriating simple elements, while those elements themselves are not found in any original unused mass, but have become simple by the decomposition of former complex structures. The evolution made manifest

by growth is a circle which returns upon itself ; not a line which begins at one point and ends at another. Each separate process has a beginning and an end, but we can predicate neither end nor beginning to the number of such processes which may succeed each other. It is the finite changing for ever in the infinite that really meets our view ; not one vast finite change, which being accomplished, all is over, and with which the infinite has nothing to do. Here lies, I believe, the real secret of the doctrine of evolution. It is a great intellectual effort to grasp the whole story of nature, in the only form in which a human mind can grasp the whole of anything ; that is to say, in the form of definite limitation. It represents the universe as limited in extent and in duration ; as beginning in an absolute simplicity, and ending in a final complexity, and forbids us to look before the one or beyond the other by denying that we are able to do so.

But such denial is distinctly unscientific, for it assumes the very knowledge that is denied. To say at any given point in the investigation of nature, we know this, but we do not at present know anything beyond, is continually true ; but to say we never can know anything beyond, knowing always that there must be something, is to assume a kind of knowledge which it is impossible for us to possess, and to adopt an attitude in the inquiry which is the very reverse of a scientific one. True science proceeds step by step, making sure of each, and making sure of nothing besides ; but never supposing that it has reached, or ever will reach, the highest or the lowest that is attainable.

57. It is very remarkable that Mr. Darwin's own speculations have led him to propound a theory which amounts to a categorical denial of Mr. Spencer's doctrine of evolution. The theory of Pangenesis, instead of treating the development of a plant or an animal as a process in which the homo-

geneous passes into the heterogeneous, supposes the original germ to possess the entire heterogeneity of the full grown product. Everything in the whole structure, down to the minutest detail, is already represented in the germ, and growth is simply enlargement of each part by the addition of fresh matter, attracted by it and moulded by it. We have only to contrast this with the nebular hypothesis, or to imagine the germ of a world to be like one of Mr. Darwin's germs, in which case it must contain in miniature every detail of the future globe and of all its inhabitants, to see how the one idea is opposed to the other. Individual development on the theory of pangenesis is simply increase in size, by the multiplication of something which exists complete already, and the analogy on which Mr. Spencer's doctrine is founded is thus altogether abandoned.\*

58. The views I have been supporting are commonly called Uniformitarian. But the name is a misnomer. Uniformity is found only in the Laws of nature; never in its Processes. The idea that the world at any former period was exactly what it is now, or that the remote ancestors of any living form were in all respects undistinguishable from their descendants, is untenable on every ground, and certainly forms no part of my own conception. The question at issue is not whether changes occur and animals alter. The fact has never really been disputed, though our knowledge about it is for the most part of very recent date. The question is, whether we have learnt the secret of these changes, and whether it is, as the doctrine of evolution represents it to be, a purely material and mechanical one. And it soon resolves itself into the still simpler question, whether all things are in fact the same thing in different quantities and positions; or whether there are essential differences as well as formal ones.

\* *First Principles*, § 48.

we are to describe two kinds of animals in such a way that these may be defined precisely, so that we may see at once why one of them cannot change into the other by any mere change of quantities, is doubtless a grave and difficult question. But our inability to answer it satisfactorily is not surprising, because no systematic analysis of the subject has been attempted. It is not in structure itself, but in the causes of structure, that the answer must be looked for. When a living germ develops in one way and not in another, there is a reason for this. If a fish produces teeth and scales, while a bird produces claws and feathers, the cause of this difference is not to be found in the shape of their bony skeletons. We have to find out these causes, and when they are found out we shall doubtless be able to say which of them do, and which of them do not, differ from each other essentially. In the meantime, analogy as well as observation leads to the belief that essential differences really exist, and no amount of resemblance weakens the inference where it is independently suggested.

63. The facts of embryology furnish no real argument in favour of the doctrine of evolution. The general fact is that each living germ builds up a certain structure, from which other similar germs are produced; the history of each structure being that it is built of materials furnished by the disintegration of other structures, and that, having answered its purpose, it becomes, in like manner, disintegrated itself. This is not evolution, but merely cyclical change. Its analogue is not the growth of the universe out of a real chaos, but the revolution of a planet in its orbit. The orbit varies within certain limits, and is itself carried forward in the greater orbit of the sun, so that change is constant, and there is no precise repetition of the same thing; but the change is that of constant adaptation to infinitely varying conditions; not of mechanical movement from one condition to two, and then to three.

64. And if, in the growth of an embryo, the lower forms of life are first produced in the development of the higher forms, this only shows that the best structural course is being pursued. Those higher forms must be built up somehow or other, and, the lower forms being unquestionably good in themselves, there is every reason to suppose they will be the best constructive steps in the formation of higher ones. The higher differ from the lower not by being destitute of their vital qualities, but by having these and something more. And when arrest of development is spoken of, it must be remembered that the power of stopping at a given point is as definite and distinct a thing, and involves a cause just as special, as the power of going beyond it.

65. The assumption that rudimentary organs are proofs of an ancestry in whom the organs were fully developed, is for the most part a gratuitous one. No doubt, organs falling into disuse may decrease in size, and may be reproduced in this diminished form from one generation to another. But the meaning of this persistent reproduction, as well as of the appearance of rudiments never developed further at any former time, admits of a very different interpretation. Nothing in nature is more certain than that every living creature is endowed with surplus powers. None are left with exactly what is necessary for life under precise conditions, and no more. Rudimentary organs are proofs of this surplus power. They show the directions in which it is most easily exerted, and are evidence of a capacity for meeting altered conditions in which their further development may be required. If we find foetal teeth in the whale, we may take for granted, not that whales are descended from some other creature in whom the teeth were fully developed, but that if teeth were necessary to the animal, either in the past or the future, there is a power in it capable of producing them.

66. To say of rudimentary organs that they are useless, is to assume what it is impossible for us to know. The power to produce them being present, it may be useful simply to have it exercised; and there is surely an astounding hardihood in declaring any part of a living being to be really useless, because we, who are ignorant of the whole secret of life, cannot see what purpose it serves.

The distinction between rudimentary and nascent organs cannot, I think, be made. Mr. Darwin has endeavoured to make it, but he has no other test than that of their comparative utility. He simply calls an undeveloped organ rudimentary, if he cannot see the use of it, and nascent, if he can.

67. There is, of course, much more to be said on these subjects. I have endeavoured only to point out special lines of thought.

The object of this Paper has been chiefly a destructive one; but it is not my own belief that no satisfactory theory concerning the manifestations of life is possible, or that the labours of our great naturalists and physicists are thrown away. On the contrary, I believe that a law much higher than that of evolution exists, and is discernible; but it is not a mechanical law, and cannot be entered into here. The conclusion I wish to suggest is, that the two foundation stones of the doctrine of evolution, — the nebular origin of the world, and the appearance of the higher forms of life at a later period than the lower forms, — are not facts that have been proved, but mere hypotheses, for the truth of which no real evidence has yet been found; and that, apart from these, the changes which are matters of actual observation do not sustain the idea of evolution as a general law of change. If this is so, the doctrine, however interesting as a speculation, does not deserve, and cannot permanently retain, the place that has been given it as one of the axioms of modern science.

## ON THE THEORY AND PRINCIPLES OF ARCHITECTURE, AND ITS RELATION TO MODERN LIFE.\*

By H. H. STATHAM, JUN., A.R.I.B.A.

WHAT is "Architecture?" The question is not a mere form; for the writings even of professed architectural critics prove the existence of a considerable diversity and vagueness of opinion on the subject; and by the non-professional public the whole scope and aim of the art has been, I think, a good deal misunderstood, partly owing to the fact that it occupies a peculiar position among the arts, quite distinct from that occupied by the imitative arts, sculpture and painting. It is desirable, therefore, if only for the sake of clearness, to come to a distinct understanding, in the first place, as to the sense in which we mean to use the term "Architecture."

Now, for some time past, the whole of architecture has, with us, consisted in borrowing and imitating some fashion of building which prevailed at some previous time, or in some other country. During great part of the last century, everything we built was *Roman*, unhappily, the Roman style having been in the main one of the most vicious architectural styles that ever flourished. About the commencement of this century, some active researches amongst, and subsequently published illustrations of, the remains of Greek architecture, turned the tide, and everything was to be *Grecian*. Since then a new fashion has set in, and nothing is thought of but *Gothic*; that is, an imitation of the style

\* The main part of this essay appeared, in substance, as an article in *Frazer's Magazine* for June, 1871, but in a somewhat different form, and of course, without illustrations.



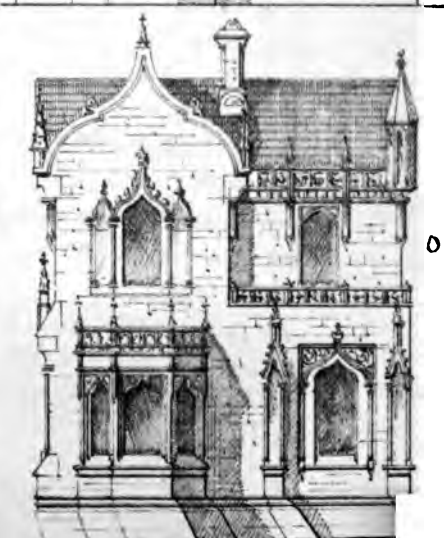
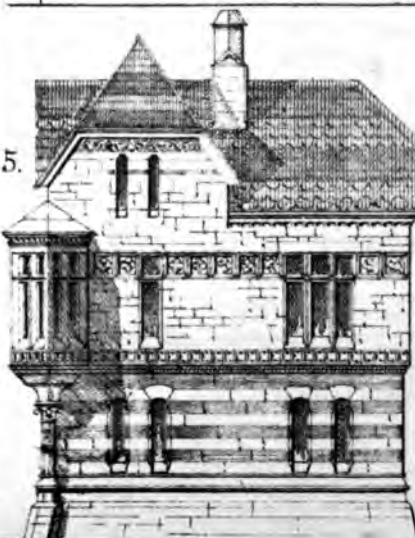
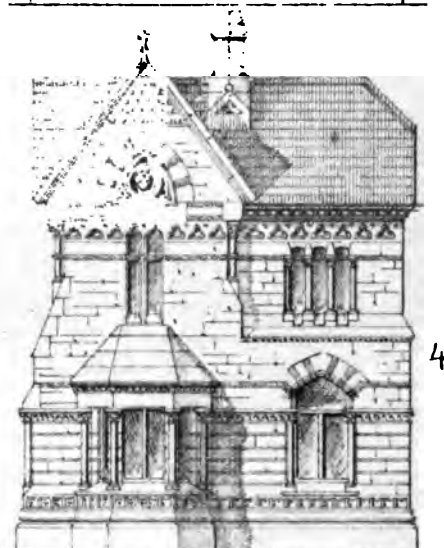
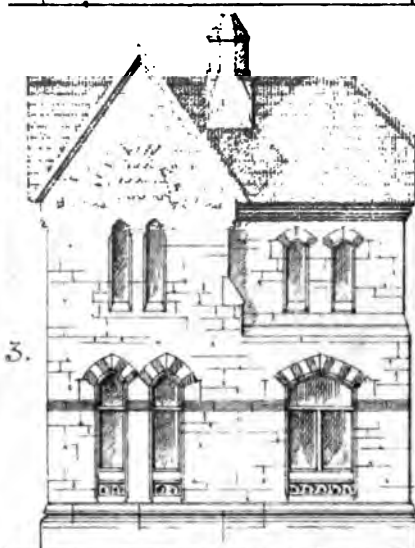
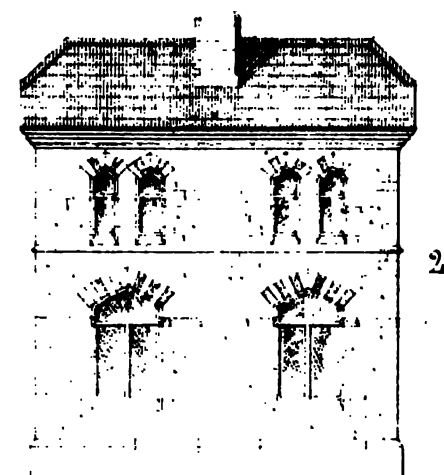
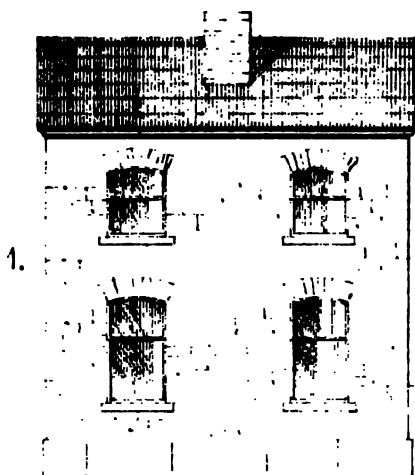
of building practised in England and France during the twelfth, thirteenth, and fourteenth centuries. Circumstances have combined to draw more of public attention towards this last revival than towards its predecessors; and various glossaries and manuals of Gothic architecture have become more or less popular, and have found a place in amateur libraries. I wish clearly to place before you that all this is not "architecture;" it is merely *archæology*, which is a totally different thing. The Art of architecture is one of which the principles have always been the same; and the various forms which it has assumed — Egyptian, Greek, Gothic, &c. — are only the various ways in which the same principles have found more or less perfect expression. It is idle to copy these forms indiscriminately. You can no more make a building architectural by putting Greek columns or Gothic buttresses on to it, than you can make a book poetical by quoting poetry in it. You can no more learn the principles of architecture by reading *Parker's Gothic Manual*, than you can learn the principles of painting by studying the catalogue of the National Gallery; all you get in this way is some isolated facts as to the history of one style. The object of this paper is not to bring forward anew this kind of desultory information, but to show, as shortly as possible, in what the art of architecture essentially consists, what is its special standing-ground in relation to the other arts, and what is the true distinction between good and bad architecture. In doing so, we shall have to refer to forms and details of more or less known styles, not with any reference to the chronological history of architecture (for we are dealing with that which is independent of chronology), but as illustrating the application of principles.

To return then to our question, What is architecture? If, on the one hand, it does not consist of applied ornamental features, what, on the other hand, distinguishes it from mere

practical *building*? for we all use the word "building" frequently without meaning to include under it anything that we should call architecture. If the latter were to be defined in a single phrase, I should describe it as the art of *expressive and decorative construction*. So long as the materials of a building are merely put together with the necessary regard to the conditions of stability, without any other consideration entering into the mind of the constructor, we cannot say that the architectural element is in existence at all. But so soon as the said materials come to be arranged in such a way as not only to serve their practical purpose, but to express and emphasise that purpose, then the architectural element comes in. When, in addition to this, the various parts of the building are arranged so as to form a symmetrical or picturesque outline and grouping, and to strike the spectator with a sense of care and thought bestowed on such arrangement, then a step further is made, and here what may be called the poetry of the art commences. And when we have, in addition to this, enlivened and given point to the prominent features of the building by more detailed decorative treatment, then we have got as far as the art of architecture can go. We may decorate a building very sparingly, or very profusely; and so long as the decoration is rightly applied in accordance with principles to be mentioned just now, it may be equally good and pure architectural treatment in both cases. But if we introduce high class sculpture into a design, we are then going a step beyond the province of architecture; we have added to it another art, which rests on an entirely different basis. And in considering architectural design in any of the three stages just mentioned, it must always be borne in mind that this is an art entirely based upon practical and constructive necessities; that the plan and construction of a building are always the first things to be considered, and the architectural aspect is

merely the outward expression of these. Whenever the reverse is the case, when some particular phase of architecture is adopted first, and the plan and arrangement made to conform to it, the result is always a falsity. So with the outline and composition of a building; if we introduce some prominent feature, such as a tower, into the design, it must have reference to and mark out some important point in the plan — the principal entrance, for instance — and not be placed at random wherever the designer thinks it may look pretty: to do that is to make a mere child's plaything of architecture. The same rule must be carried out in the decorative detail: ornament is to be introduced only as an addition to and decoration of features already existing as part of the construction; any separate feature introduced merely as an ornament is an excrescence and an impertinence. In other words, and to put it antithetically, we may *decorate construction*, but we may not *construct decoration*. This last principle is a most important one, to which we shall have to refer more than once, and the observance or neglect of which forms one of the most decisive marks of good or bad, true or false design in architecture.

A reference to the illustrations, Figures 1 to 6, may render the foregoing remarks more clear. We will suppose Fig. 1 to represent one side of a small two-storey house. In this case there is not a feature beyond what construction demands. The thickening of the wall at the base, forming the projecting base course or *plinth*, gives a better foundation for the superstructure; the arched form is the strongest way of building the window heads; even the regular spacing of the windows under each other is a constructive provision, as it is bad building to put solid piers over openings. This drawing then represents mere *building*, not *architecture*. In Fig. 2 we employ some of the simplest sources of architectural expression; the shape and proportions of the window open-





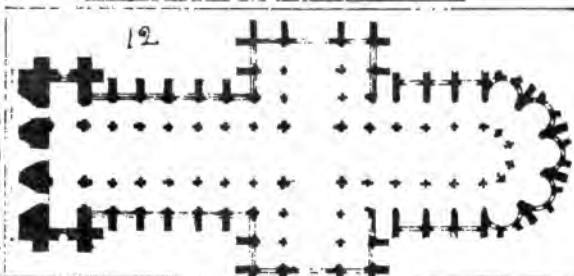
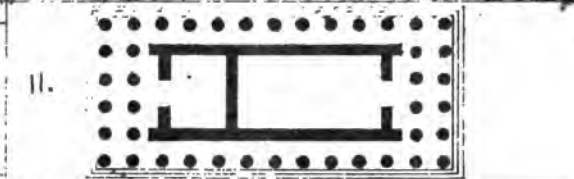
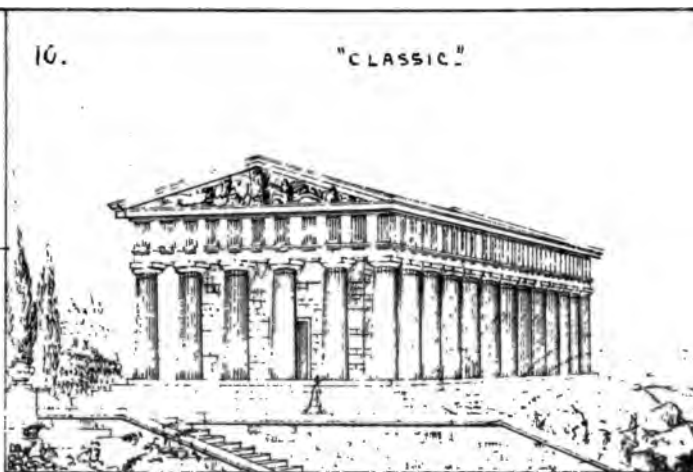
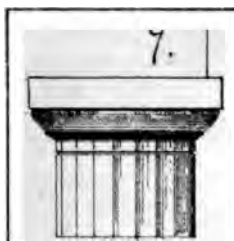
ings are varied, the angle at the meeting of the roof and wall is filled up by the projecting masonry forming the *cornice*, which also helps to carry the gutter; the division into two storeys is marked by the horizontal moulding (*string-course*) carried across under the first-floor windows; a horizontal band of darker coloured stone connects the lower windows, and gives unity to the whole; the arches are formed with light and darker stones (*voussoirs*) alternately; and the angles of the gables are sloped off to give a little less squareness of outline. This general squareness of aspect is much more effectively relieved in Fig. 3, where, by setting back the right hand portion of the upper storey wall a few inches, we are enabled to form a gable on the left hand, and give an entirely different proportion to the building, and do away with its squatness of form. The arch formed in the gable wall is not for mere ornament, but to throw the weight of the upper part of the gable off the window openings, and on to the main piers on each side; being there, we make it a decorative feature by light and dark *voussoirs*, and by a simple ornament on the surface of the masonry contained within it. The plinth in this case is also marked by a strong and deep moulding. In Fig. 4 a projecting bay window is introduced; but as in order to obtain this window it is necessary to cut away a great portion of the main wall behind it, which would leave a very insufficient pier of masonry at the outer angle, this angle is strengthened by the wall being extended as a buttress; which feature it will be seen therefore is not a mere ornament, but a necessary piece of construction treated ornamentally. The various features of the design are connected together so as to give an appearance of unity to the whole; the small arcading introduced under the cornice on the right is carried across the gable, and the heads of the gable windows made to range with it; the dark band on a line with the transom of this

window coincides also with the *caps* to the shafts of the other first floor window, and with the *bands* on the shafts on each side of the gable; and the horizontal band of carving in the lower storey coincides with the capitals of the bay-window pilasters. The portion of the masonry below this is treated in a bolder manner than the rest, with large horizontal joints (called technically *rustication*), giving greater weight to the lower storey; the masonry in the apex of the gable is lightened by a fret ornament. In all these cases we have been considering the building as one in which the lower storey was the most important. Reverse this, and suppose a building in which the lower storey was a mere office and the upper held the living rooms, and the treatment must be varied, to give characteristic expression. Thus we see in Fig. 5 the lower storey treated with the greatest plainness and simplicity, and strengthened in expression by horizontal bands of light and dark masonry; the upper storey projected out so as to give it additional importance. The connection of various parts is here again kept up by the row of panels ranging with and repeating the upper lights of the windows. Fig. 6 is an example of "how not to do it." There is more carving and ornament here than in any of the other designs, but it is placed almost without principle or motive, and becomes worse than valueless. The different parts are insufficiently connected, the pinnacles and angle turret are mere excrescences, the buttresses on each side the lower window without use or meaning, the general treatment thin and wiry, and unsuited to stone. There is nothing here, however, that is not frequently found in the many modern buildings which belong to what may be termed the *gimcrack* style of architecture.

But now that we have sufficiently distinguished between *architecture* and mere *building*, we are led not unnaturally to the question, What distinguishes this art, in its more orna-



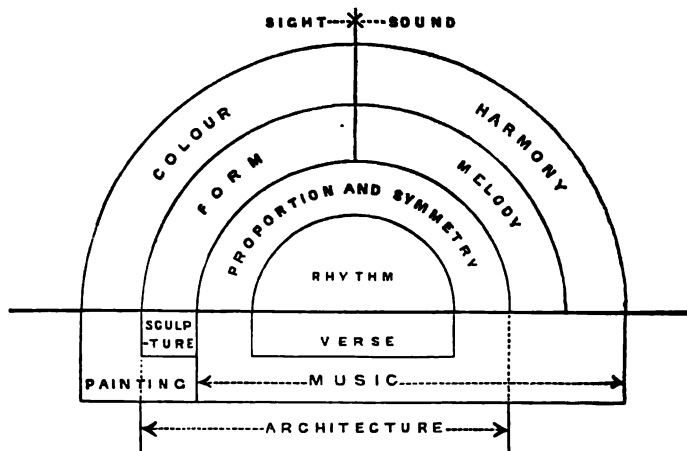




mental features, from sculpture and painting; on what distinct basis does it rest; what is the extent and nature of the expression of which it is capable? We know that the painter aims in the first instance at the imitation of natural objects; many paintings go no further than this; and those which do go further, which impress us with a distinct idea or subject, do so through the medium of imitated natural forms, such imitation forming the language through which they address our minds. Now it is not an uncommon idea among popular writers that architectural ornament depends on the same means; that it imitates nature. There is an old story, that the Corinthian capital (Fig. 8) was first suggested by the sight of a basket of acanthus leaves with a square tile placed on the top of it. There is a wide-spread heresy, which I have seen dozens of times in print, that the general interior aspect of a vaulted Gothic cathedral, with its tall shafts and spreading vaulting ribs, arose from the attempt to imitate the effect of an avenue of overhanging trees. Now all these pretty fancies are just—fancies, and nothing more; an investigation of the scientific development of architectural construction dispels them at once. The leading and most perfect architectural features of which we know the history, have not been the offspring of a sudden inspiration, but the growth of years and even generations of experimental treatment of features originally purely constructive. And the difference between such features when perfected, and the works of sculpture and painting, is, that the latter copy the *facts* of nature, while architecture copies the *principles* which underlie the facts. Architecture can put no facts before us, can define nothing; it can only deal in general expression. Painting particularises, architecture generalises. Painting studies and portrays nature physically, architecture metaphysically; and so far from architecture being concerned in imitating natural forms, the fact is that in general architec-

tural design is weak, faulty, and mistaken exactly in proportion as it descends to literal imitation. There is only this reservation to be made, that (as we shall see just now) a nearer approach to natural form is permitted, in proportion as we descend from the general design of a building to the more minute details.\* Taking as an instance one of the most perfect of all architectural features, the Doric column and capital (Figs. 7, 18), it is easy to see that this is in fact, so far as its practical purpose is concerned, an upright support to

\* The accompanying diagram may serve to illustrate roughly the relative ground occupied by the main divisions of art:—



Rhythm and symmetry or proportion can be expressed both by sights and sounds; *form* is the counterpart of *melody*, and *colour* that of *harmony*, in sight and sound respectively. Verse obeys only the law of rhythm; Music and Architecture are alike subservient to rhythm and symmetry (or ought to be so!) and deal with form and melody under these restrictions; Sculpture is confined to pure form, but unrestricted by symmetry; Painting includes form and colour; so that the general capabilities of the arts, in relation to nature, might be stated thus:—

Painting = is capable of direct imitation of external forms of nature.

Sculpture = " conventional imitation of external forms of nature.

Architecture = " general expression and character by proportion, outline, and rhythm, and highly conventionalised imitation of form in details.

Music = general expression and character only, by proportion, harmony, melody and rhythm.

Verse = bows only to the one central law—"Rhythm moves the world."

resist vertical pressure, with a square slab at the top to receive the superincumbent weight. For practical ends a simple post and tile (Fig. 19) would suffice, but "architecture" requires that the feature should express its function in a decorative manner; and thus the cylindrical shaft is striated by vertical grooves and ridges, which serve to break up its surface into lines of light and shadow, and at the same time emphasise the vertical expression of the feature. The tile or "abacus" is not set barely on the column, but the junction of the two is assisted, and the apparent strength of the abacus increased, by the curved moulding introduced between it and the column (Fig. 7). We can recognise in this architectural feature the same general principles which are to be found in Nature; in the arm and hand uplifted to support a weight, we see the muscular markings on the arm, the diminution towards the extremity, the narrow neck or wrist, above which spreads the hand which acts as a support:\* only the arm and hand are totally unsymmetrical, being intended for fifty different uses besides that at present regarded, whereas the column is a feature specialised for the one purpose of resisting vertical pressure, and that only. As a richer and more ornate style succeeded to the severe majesty of the Doric, we find, in the Corinthian capital and in the so-called "honeysuckle" ornament (Figs. 8, 9), a still nearer approach to natural form, but still with a degree of symmetry never found in Nature, and which entirely redeems these features from the charge of being literal imitations. And indeed, elegant as these ornaments are, it may be doubted whether the nearer approach to natural form does not in some degree impair their æsthetic interest, and whether the purely meta-

\* It is not of course to be inferred that the Greek artist knowingly took his idea from the natural limb; this would be contrary to all known analogy in the *genesis* of architectural features. All that is intended is to show how, in a satisfactory and well considered architectural feature, the principles of nature will be found, on analysis, to be exemplified.

physical imitation of the Doric capital is not the more interesting to the educated eye.

Now if we turn from the remarkably pure and perfect Greek style to the only other style that can be at all compared with it in these qualities, the early Gothic, we find the same adoption of the principles rather than the forms of Nature carried out, though in one respect in a different direction. The aim of the Greek architect was to emphasise *weight* in his design; the plain heavy unbroken lines of the cornice and architrave, the thick proportions, and the whole treatment of the column, combine to emphasise the idea of weight and vertical pressure in the materials. The mediæval architect was actuated by an opposite wish. His object (and it was one in direct relation to the feelings and tendencies of his age) was to forget, to annihilate weight; to give his structure an expression not so much of resting on, as of springing from the earth. In reality, he dealt with much heavier masses of material than the Greek architect ever troubled himself with; but he contrived so to treat them as almost to cheat the spectator into a belief in their airiness and lightness. And how was this done? By breaking up his supporting masses or piers into an apparent bundle of thin reedy shafts of long and slender proportions (Fig. 31). It was only by very gradual steps, extending over two or three centuries, that this treatment was arrived at; but at the point to which we have here come the result is perfect; we forget the weight and mass of the pier and superstructure in the soaring lines of the vaulting shaft, and the easy bending curve of the ribs which spring from it. But *why* does this thin shaft of the Gothic architect rid us of the idea of weight? I reply that this is the same repetition of the principle of Nature before alluded to; for in natural vegetation we always connect the idea of long slender stems with an absence of superincumbent weight. The process of reasoning is merely reversed

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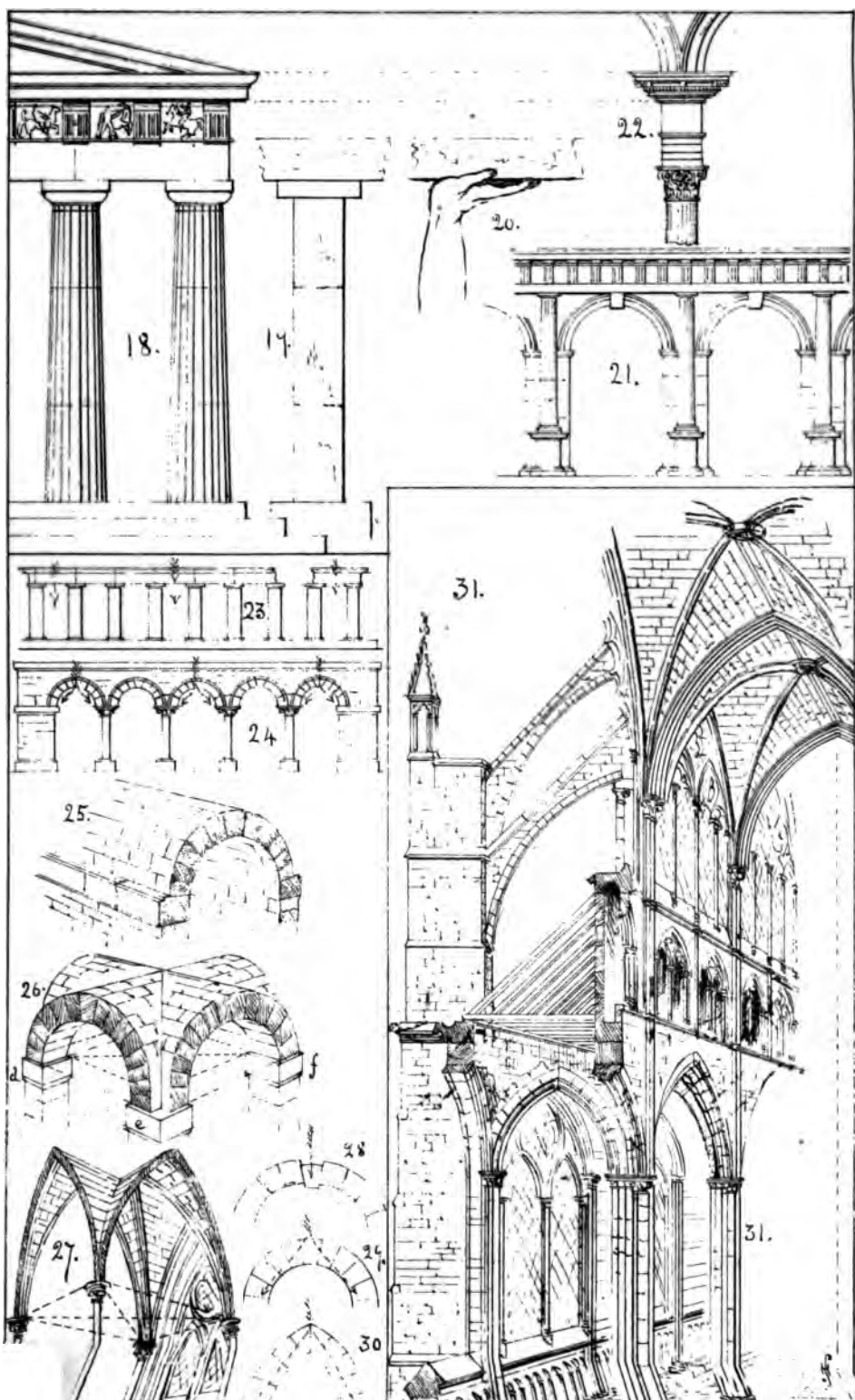
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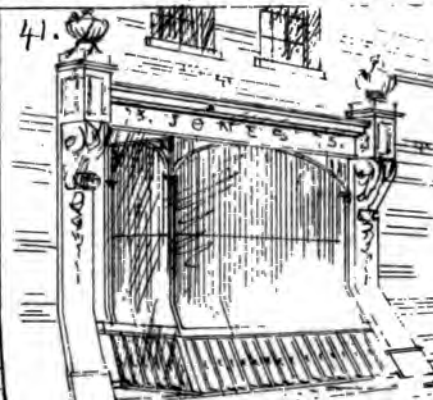
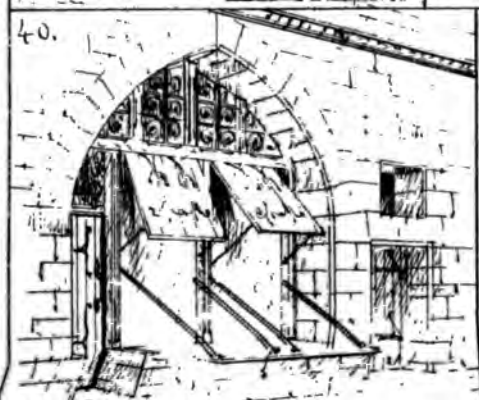
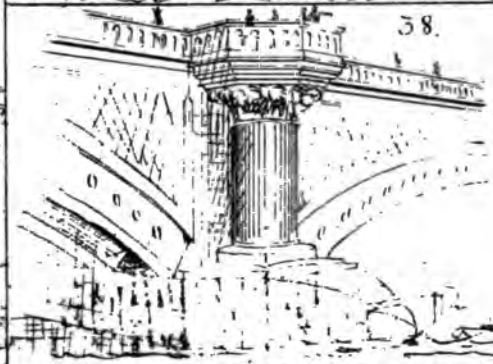
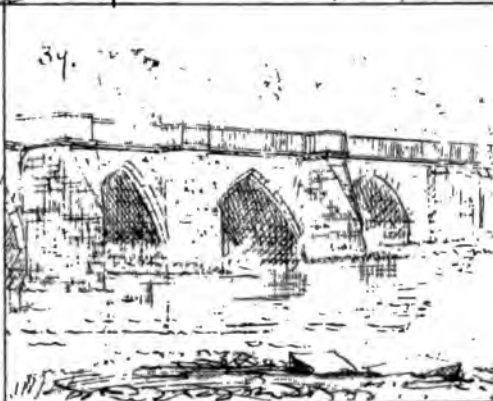
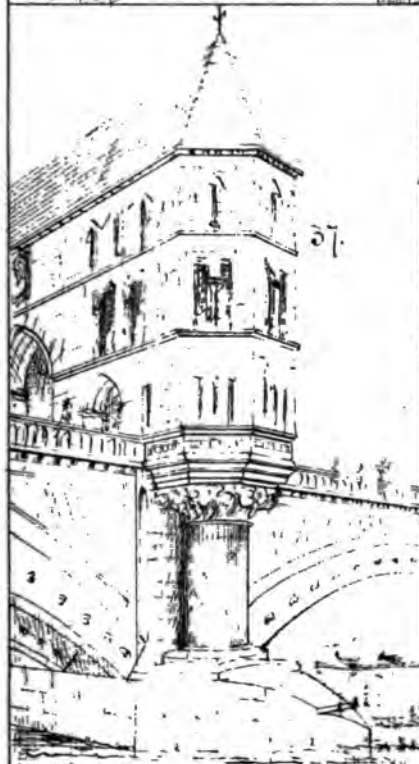
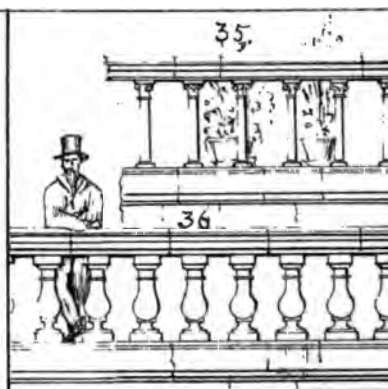
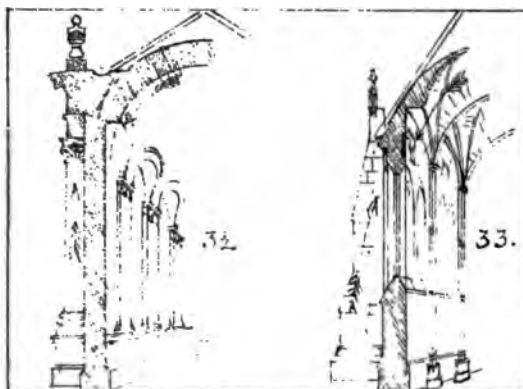


in the two cases; the stem in nature is tall and thin because it has no weight to carry; the Gothic shaft appears to have no weight to carry because it is tall and thin. Of the vaulting ribs I have a word to say just now. But if we now turn to the Gothic foliage and decoration, we find in its best examples the same imitation of principle rather than form, the same *conventional* imitation of nature; but with this slight difference, that as the Gothic building does approach somewhat nearer to the picturesque freedom of line in nature than does the highly artificial form of the Greek building; so its detail is permitted to approach proportionally nearer to the forms of natural life, though still, in the best period of the style, kept quite clear of direct imitation. This is exemplified in the beautiful capital from a church in Lincolnshire (Fig. 14), where the foliage, comparatively free in its line and growth, is nevertheless of a completely petrified character, if we may so speak, and unlike anything in nature. We see, however, in the Gothic the same progress as in the Greek, from metaphysical to physical imitation. The capital of the earlier Gothic period may be regarded as the antitype of the Doric, while the freer and richer foliage of the later Gothic (Fig. 15) is the antitype of the Corinthian capital. This later carving, however rich, has not the beauty of thought and fitness visible in the earlier example; and in the late French example (Fig. 16) we see to what meagre and ugly performances the mistake of literal and unsymmetrical imitation of nature could carry the artists. A further illustration of the superiority of the conventional treatment of foliage ornament is given in Fig. 13. This is supposed to be a hollow moulding, with a line of foliated carving supporting the upper side of the hollow. *a* is simply bad, no attempt having been made to give to the foliage forms any look of design or arrangement at all. *b* is better, because here the leaves are arranged with an evident design, but



here still they are too like nature, too soft and pulpy-looking, to satisfy the judgment when viewed as a portion of architectural structure. This is corrected in *c* (a beautiful French example), where, while the *motif* of natural growth is preserved, a degree of stiffness and symmetry is imparted to the ornament which removes it from association with the vegetable world, and gives it a distinctive character, in keeping with the harshness and precision belonging to architectural design. It may here be observed in passing, that a feature which looks well on a large scale in architectural design, may be very unsatisfactory when repeated on a smaller scale, or *vice versa*. This is illustrated by Figs. 35, 36, representing two balustrades, each about three or four feet high. The first is a row of ordinary classical columns, which would look quite suitable on a large scale, but which on the scale shewn appear mere meagre sticks. The second design represents a common and good form, admirably suited for the dwarf columns of a balustrade, but which, if magnified to the size of (for instance) the St. George's Hall colonnade, would appear a barbaric monstrosity, fit only for one of Martin's pictures.

The comparison of these two leading architectural styles, however, will furnish us also with the best and most striking example of the relation between mechanical construction and architectural design; a subject which takes us a little into technical matters, but which must be entered into, to some extent, before the theory of architectural design can be at all appreciated. The Greek and Gothic styles are the two most pronounced and purest forms of the two leading principles of construction which have been in use in architecture: the one called the *trabeated* (from the Latin *trabes*, a beam), because in it every opening is bridged by a beam or lintel; the other the *arcuated*, because, as the term sufficiently implies, every opening is bridged by an arch. Now the





mechanical statics of these two styles of construction of course differ very much. In a row of columns (as in Fig. 23), each two columns, with the architrave which they support, are an independent piece of construction; and if all but the two end ones were removed, there is no reason why they should not stand as well for ever, unless displaced by accidents. In a row of arches the case is different. The arch is a set of stones wedged together so that they cannot fall, and any weight above it (including its own weight) is transmitted downward through the archstones to the springing of the arch. An arch, therefore, is (theoretically) always thrusting outwards at the foot; and it is essential that some counter-acting force (abutment or *buttress*) be provided to meet this thrust. A row of arches will mutually balance each other, till you come to the two end ones, which must have special abutment (Fig. 24); if those come down, all the rest must follow; but if an arch is thoroughly secure at the springing, there is no limit, save that imposed by the strength of materials, to the space over which it may be carried, and accordingly it affords opportunities for bridging much larger openings than the Egyptians or Greeks could ever manage with their monolithic lintels. Now the Romans, who were the natural successors to the Greeks in architecture, and who were great engineers but very bad artists, were very quick to find out the constructive advantages of the arch; and, by adopting it in their buildings, were able to construct edifices of an extent and grandeur, in one sense, such as the Greeks had never dreamed of. But they do not seem to have had the least power of inventing an architectural expression to coincide with their arched construction. Not knowing how to combine the arch with the Greek column, they either used the Greek trabeated construction as a kind of screen in front of their real arched construction (Fig. 21), or they took the column, with a slice of the architrave, and then

sprung the arch from the top of that (Fig. 22). But it was in the problem of roofing that the tug of war came. If a building is to have an arched roof, the most primitive way of doing it is with what is called a "barrel vault," that is, a continuous round arch resting on the wall for its whole length (Fig. 25). This would, as we have seen, exercise a thrust against the wall, which would have to be made of corresponding thickness to resist this thrust. Now the invention of vaulting consists, in its earliest form, of cutting off a part of this barrel vault by a cross vault intercepting it at right angles (Fig. 26). Thus the thrust of the arched roof, instead of impinging against the wall for its whole length, only does so at certain points (*d, e, f*); and if we can make those points of the wall strong enough, the intermediate portions will take care of themselves. Now the Romans apparently could conceive no way of strengthening their wall except by planting pillars against it, at the required points; so that here you see was a direct contradiction between construction and design; a feature designed to express resistance to vertical pressure being placed to resist what was in fact *lateral* pressure (Fig. 32). So long as this contradiction existed there could be no true architecture; what was called the architecture was only a piece of scenery, totally independent of the real building. It was not till the first hint of the feature now known as the *buttress* arose that there was a chance for architecture to blossom again into real and genuine life. But with that one feature was constructive truth restored again to architecture; for the buttress was, in appearance, what it actually is, a prop set up against the building to resist lateral pressure (Fig. 23). As this feature became further developed, and as the system of vaulting grew more complicated, and the builders, made bold by success, carried their vaults higher and higher, the wall by degrees assumed quite a new position, and, instead of being a continuous longitudinal

mass, the main weight and material of it was in fact divided into sections, and placed at right angles to the building to resist the lateral pressure of the vault at the points where it is collected, and the intermediate parts of the wall became a mere screen, which might almost have been dispensed with, so far as the construction was concerned. This will be seen on reference to the typical plan of a Gothic cathedral (given in Fig. 12) ; and a comparison of this with the Greek temple plan (Fig 11) shows also how the architecture had changed, under the influence of the arch, from an external to an internal architecture ; the columns in the Greek temple being all exterior to the main wall, the piers of the Gothic temple interior. The section (Fig. 81) shows how the thrust of the vault over the outer aisle was provided for, where no buttress could be built immediately adjacent to the wall, by the device of the flying buttress, which transmitted the pressure over the side aisle roof to the main buttress at the outside ; this mass of wall, which at first sight seems so little connected with the centre part of the structure, being in fact its main support.\* And to show still further how completely the beauties of the Gothic style have their origin in construction, it may be observed that even the pointed arch, which has been supposed to be arbitrarily chosen as a more ornamental form than the round one, had in fact a constructive origin ; for where large arches are used, which are to support a considerable load, the pointed form is stronger and more stable than the round one ; because, in a circular arch of large radius, the joints of the archstones or voussoirs in the crown of the arch will be nearly vertical, and the arch will have a tendency to sink at this point under

\* The flying buttresses have not unfrequently been supposed by the uninitiated to be for ornament only ; an idea which may be excused when we find, at the recent restoration of Chester Cathedral, the flying buttresses built up by the modern restorer for this purpose, though the vault is a sham wooden one which exercises no thrust.

a heavy vertical pressure (Fig. 29, 28); whereas, in a pointed arch, the radiating joints are much more nearly at a right angle with the line of pressure, and have not the same tendency to slip (Fig. 30). And by recent observations among the buildings which were erected while the transition from round arched to pointed arch architecture was still going on, and where round and pointed arches are mixed, it is found that, in nearly every case, the large arches which carry the superstructure are pointed, while the smaller arches, which are more in the nature of ornamental work, and have less depending on them, are circular. There are other points in connection with the construction of vaulted roofs which must have influenced the builders in using the pointed arch (without which, indeed, many of these roofs could not have been built at all); but this could hardly be explained without going more into technicalities than would be suitable here. But we see that all the distinctive peculiarities of what is called "Gothic" architecture, though their combined effect appears far more free and unfettered than that of Greek architecture, nevertheless equally had their rise in the practical requirements of construction. And though the illustrations here given are necessarily but scanty in comparison with those which exist, I think they are at least enough to intimate that the "long drawn aisle and fretted vault" of the mediæval cathedral did not arise from any such child's-play as the attempt to imitate groves of trees.

Now if these general principles of architectural design were a little better appreciated than for the most part they are—if some general knowledge of the subject were considered a part of polite education, as a general knowledge of the principles of grammar and literary composition is considered to be—we certainly should not see such absurdities and incongruities in so-called architecture as we frequently do see around us. If, for instance, it were recognised that

a column with its capital, on the classic type, is a feature intended to appear capable of supporting a heavy superstructure, we should not have to lament the ridiculous apparition to be seen in various cities, of a great bare column, planted by itself upon the earth, to sustain a little statue at a height where it is dwarfed into insignificance. The column is part of a building; why drag it from its proper position and office there, to put a statue of Wellington on it? I am in daily expectation of seeing a Gothic buttress erected to the memory of some distinguished man; it would be just as appropriate. This very feature, the buttress, is constantly misused in a most foolish manner, and is tacked on to buildings which require no such support, from an idea that it is ornamental, or (still more absurd) that it is "ecclesiastical." In short, as a nation, we are now playing, architecturally, the part of the Romans over again. Like them, we are (as a nation) good engineers and bad architects; and we are occupying ourselves in copying and reproducing architectural forms of past ages quite independently of their origin, meaning and intention; and so rooted has this fallacy become, that many people actually think an architect is not using them fairly unless he can assure them that the building he is designing for them is a copy of something old. This misappropriation of old features has been very much fostered by one particular body of men amongst us. It can scarcely be questioned, I think, that the hardest and most important practical work of the nineteenth century has been done by the engineers. They have had the ball in their hands, and very well they have played it—as engineers. But *ne sutor ultra crepidam* is a very good motto; and our quarrel with the engineers is as touching their attempts at architecture. There seems to be a confused notion among them that they ought, somehow, to make their constructions "architectural"; and this they do by planting on to them certain



pillars, pilasters and so forth, without the least reference to the construction. I give one instance of this from a very important modern engineering work, because it is a singularly apt illustration of this kind of misapplication of architectural expression. Looking at the large thick column shown in Fig. 37, it will be recognised by the eye at once that this feature is quite adequate to the support of the large pile of building placed over it, and could not, in such a position, be designed less massively, to look satisfactory. This is an imaginary sketch, so far as the upper part is concerned, but the lower part represents a pier of the new Blackfriars bridge over the Thames, and Fig. 38 shows what this immense column really supports, viz.—nothing. The mass of material at the side of the pier may be necessary to give stability to it, but it has been applied in the wrong form, and with the wrong expression; it is a feature to resist vertical pressure, where lateral resistance was really required; and, in spite of all the expense bestowed on the granite and the carving, it is to the architectural eye an eminently unsightly and unpleasing object; while the plain simple masonry pier of the Chester bridge over the Dee (Fig. 39), where the material is treated in accordance with the real facts of the construction, will remain a pleasing object as long as it lasts.

But in considering the application of architecture to modern times, it must be remembered that this art is one largely influenced by extraneous circumstances, more especially by considerations of climate and social habits and mode of life. In regard to climate, there are certain modifying influences which will occur to every one. A hot climate and a strong sunlight will lead to small windows and open colonnades; a dull sky and a colder climate, to larger windows for light and close porches for warmth and shelter. In a dry serene climate, flat roofs may be very

pleasant; in an inclement climate, sloping roofs are absolutely necessary for throwing off rain and snow. But climate exercises also an important influence on the purely ornamental part of architecture. Decorative treatment, which is effective under a bright sky, will be totally lost in a dull atmosphere; and *vice versâ*, the ornament which would be effective under the latter circumstances would be far too strong and violent in its lights and shadows under a southern sun. In these respects, the two styles from which I have drawn most of my illustrations seem to be the natural outgrowth of the climate under which they were developed, and of the material in which they were worked. Greek architecture is essentially a *marble* style. Its slight breaks and refined and delicate contour curves can only be properly represented in such a bright, hard, delicate material as marble, and could only realise their true effect under a bright clear sky. This is a main cause of the failure experienced in attempting to transplant the Greek style into our climate. Its delicate details have to be executed in a coarse granular material (as even our best building stone is, comparatively speaking); and the building no sooner gets weather-stained and soot-blackened than half its charm is gone. It has not force enough about it to withstand these disfigurements. St. George's Hall has already lost all the brightness and freshness of aspect which a Greek building should have, and as time goes on this will get worse and worse; whereas some of our finest Cathedrals, originally built in a style indigenous, as we may say, to the soil, are scarcely injured, so far as architectural effect goes, by the lapse of time.

We must not, however, accept this consideration as an argument for the direct revival of the Gothic or mediæval style in England, as being the only one fitted to our country. For we have to bear in mind also how deeply rooted is

architecture in the customs, habits of life, even the very tone of thought of a nation, which more or less it reflects or must accommodate itself to. We can see this relation between national feeling and national architecture in many styles, though it is almost impossible to define wherein it consists. We see in the Greek architecture, with its pure, simple, well-defined forms, its aspect of calm repose, a reflex of the logical, rational Greek mind, with its feeling for beauty of form, its cheerfulness, its serenity, its total absence of the feeling known later in the world as *Romance*. So we see in Egyptian architecture, with its vast half-lighted halls opening one from another, its forests of columns, its avenues of sphinxes, the material expression of the mystery and superstition which hung over the banks of the Nile; and in the mediæval Cathedral, with its upward aspiring lines, its deep contrasting shadows and lights, its redundancy of ornament and multiplicity of parts, we see in a petrified form the same spirit of romantic fervour of aspiration which breathes through the sacred Latin poetry of the period. These are analogies which we can feel, but which are too subtle for definition in words. But if we look at the relation between architecture and national life from a practical point of view, we can discriminate certain definite influences which the temper and manners of an age exercise upon the character of its architecture, and must exercise, wherever that architecture is an honest and unfettered exponent of the practical wants and wishes of the age. We can perceive that where the ecclesiastical theory of life and the ecclesiastical power was predominant in a country, there the chief architectural monuments would be temples or churches; and that in building these, splendour or mystery of effect, or practical utility and convenience for hearing and seeing, would, respectively, be the chief aim, exactly in proportion as the form of worship was intended for ecclesi-

astics only or for the people at large. So, under a powerful despotism, architecture would find its chief triumph in palaces, mausoleums, and public works, intended to reflect the grandeur and magnificence of the monarchy. Again, where a nation was chiefly occupied in great commercial enterprise, and in the enjoyment of commercial prosperity, there would be sure to arise exchanges, offices, banks, and such like buildings, expressing in their outward aspect and decoration the superfluous wealth, if not always the good taste, of the owners. And in almost all countries and times till within a comparatively recent period, the architecture has thus been the product of the wants and feelings of the time, further influenced, as I have hinted, by the effect of climate and atmosphere. And every style which has thus been the expression of genuine needs has always an interest of its own, historic if not artistic. But in our own day, and in England especially, we have almost entirely "changed all this." In one half of our erections we ignore architectural expression altogether, in the other half we have made it a mere sham and plaything. We have reduced architecture to a dilettantism. Not long ago, as I observed at the commencement of these remarks, Greek architecture was in vogue, and the consequence remains with us in such a costly experiment as St. George's Hall, where the outside was designed first on the model of a Greek temple, and then the problem was how to get the inside arrangements to fit; and so we have a grand South portico which no one goes in at, and passages where gas has to be burned all day; and because a Greek temple was lighted from the roof, and had no side windows, therefore the Hall must have no windows on the "show" side, and the windows are put at the back where it is hoped no one will notice them: and so on. Now, in one sense there is more to be said for the Gothic revival than for the Greek, because it is the revival of a style which

arose on our own soil, and, so far as climate is concerned, it is just as suitable now as then. And there is no doubt that the age which produced the great cathedrals of England and France was the greatest age of building of which we have any record. But now, just see how we are using this great style. Instead of studying its principles, and working them out in reference to our modern wants, we are engaged in a kind of blind and wholesale imitation of the forms of its principal monuments, without consideration whether they are suitable or not. We are covering the face of the country with churches, which are mostly mere copies, often very poor ones, of similar buildings of five hundred years ago, and which are considered by many people to be admirable exactly in proportion as they are wholly imitations of old work. Now it ought to be pointed out that this kind of thing is as mere a fashion as are the fashions of dress, and as certain to alter; and our descendants a generation or two hence will be wondering what on earth we were thinking of to leave all these archæological efforts on their hands. If such a number of churches are wanted (whether they are or not is not a question for discussion here), it should be understood that church planning and design have no necessary connection with this peculiar form of three aisles, and arcades, and buttresses: the notion has only arisen from the fact that when what we now call Gothic architecture grew into shape and being, the country was under the dominion of a kind of religious and ecclesiastical furor, and consequently nearly all the buildings erected were religious ones. The mania for restoration, again, has been carried to an extent which is quite ridiculous. It is a right and sensible thing that such noble monuments of the past of our country as our Cathedrals, should be preserved from falling into decay, but a great deal more is done than this, and the plea of restoration is made the excuse for pulling to pieces,

patching, rebuilding, and altering not only the cathedrals, but every little tumble-down country church for which a case can be made out for sending a subscription list round. Then there has been a talk of building a Cathedral in Liverpool; and at one of the sectional meetings of the Church Congress here a little while since, it was stated, amid much applause, that fifty thousand pounds could be found at once for such an object, and (it was added) "as much more as is wanted." This, of course, means a Gothic Cathedral, such as those piles which look over the level country from Lincoln, from Ely, from Salisbury. Now I say emphatically that to build such a thing now would simply be to throw away money upon a huge expensive mediæval toy, which would be the laughing-stock of our descendants, a hundred, or even fifty years hence. The great cathedrals of the middle ages were a part of the life of those days, and they are venerable and interesting to us now because they were so, and because they are the monuments and silent witnesses of a phase of our national life, the last faint echoes of which have long since died away. The age of the Cathedral has past, and we cannot galvanise it into life again. A modern imitation would be simply a huge anachronism; which, be it remembered, once done, could not be got rid of or hid out of sight, like a bad picture or poem. Architecture is too expensive and too permanent a form of art to be made a plaything for ecclesiastical diletantism. And have the gentlemen who are so ready to promise money to build a cathedral exhausted every useful way of employing their wealth, that they can afford to fling it away on this? Let them look round this large town in which we live, and consider if there are not in its whole districts which ought to be rebuilt, before life in them can possibly attain to anything enjoyable, and whether capital might not be better laid out in rendering the crowded homes of our town healthy and pleasurable, rather than in erecting

a monument to commemorate the revival of sham mediævalism ?

And this brings me round to the consideration with which I wish to conclude these remarks. What is the problem to be solved by architecture in the present day ? It is somewhat remarkable that all the most beautiful developments of architecture in past times have sprung into being in obedience to the command of some one powerful caste, political or religious, in the society of the time. The Egyptian was the architecture in its temples of a powerful hierarchy, and in the pyramids, of a powerful and selfish despotism. The Roman architecture, again, as displayed in the Coliseum and other great monuments of the age of the Cæsars, was the architecture of despotism ; and the Gothic was the architecture of conventualism. And this was naturally so, for those castes or sects were, each in their time, the best educated class of society, and architecture as an art can only be appreciated by an educated class. But now that we are beginning to bestir ourselves seriously about educating downwards, is there not some chance of the development of what can scarcely be said to have existed at all in this country so far—an architecture of the people—a domestic architecture in the widest sense ? As to domestic architecture, indeed, in the more restricted sense, viz., the building of private houses of a superior class, there is room for a great deal of improvement. No branch of an architect's practice could be more pleasant and attractive than this, none could afford better opportunities for exercising the higher qualities of his art, were free scope allowed in it. But in regard to this branch of architecture we have at present two feelings to contend against. With one class of house-builders the love of ostentation, the desire for an appearance of wealth and consequence, exhibited in pompous square edifices with huge plate-glass windows, militates against all the quieter and

more picturesque beauties suitable to the expression of an "English Home,"

"The haunt of ancient Peace."

If in these changing times we feel that this "ancient peace" is somehow fled from our lives, I fear that in this respect a good deal of modern domestic architecture affords only too true a reflex of the spirit of the day. On the other hand, there is a curious feeling prevalent amongst Englishmen of the better class, that it is bad taste to differ strongly from your neighbour, to be peculiar, in the fashion of your habitation. An English architect of reputation, whose practice has lain chiefly in building large mansions for noblemen and others, has recorded in print his experience, that there is nothing the typical "English gentleman" dislikes so much in his house as that its architectural design should attract any attention. I think it is time the English gentleman learned better. If there is any "vulgarity" in the matter, surely it consists rather in the habit of blindly imitating your neighbours in such matters, than in exercising your own taste and making your habitation an index and expression thereof.

But in the amelioration of our ordinary street architecture lies, I think, the most important problem for the modern architect. We have, it is true, at present a style of "the many"—we see it as we walk about our streets, and a fearful and dismal spectacle it is. Not only have we the same miles and miles of dreary brick and square holes—brick and square holes—incessantly repeated, but even the construction is bad, and false, and flimsy, and what little decoration is attempted is a sham. One class of street buildings, the shop front, is very suggestive of picturesque and characteristic treatment, in the ground storey particularly, from the necessity for providing a sufficient opening for



light, and for the exhibition of goods, and at the same time for giving an adequate support for the superstructure. And how do we do this? Let me draw your attention to a contrast. Fig. 40 shews an old shop front, plain and heavy enough perhaps, but all genuine solid construction, and looking as if it would last for generations, and with no little picturesque character of a simple kind. Fig. 41 shews the typical modern shop front, resting apparently on glass, and with no real support for the superstructure but a thin iron column in the rear of the glass, which is generally concealed as much as possible, as being an eyesore. Over the window is a sham classical cornice, made of pieces of wood adroitly put together, and stopped at each end by a wooden hand-box, in the shape of a pedestal hung in the air, and with a wooden urn, or some such thing on it. This is the regulation wooden shop front. Now you may think this a small matter to make a talk about; but just look at the thing in the aggregate, and consider the throwing away of time, labour, and material which is involved in constructing this kind of absurd sham architecture all over the shop fronts of a large town; not to speak of the evil of habituating us to the sight of what is unreal and flimsy, till we almost lose any sense of the value of the opposite qualities of solidity and truthfulness in building. We are so accustomed to this mass of ugliness flanking our streets, that we can scarcely realise what it would be to have a picturesque and varied treatment of the buildings meeting us at each turn. In regard to one class of street buildings, however, I think money is at present being spent rather recklessly and unnecessarily. I mean offices. There is a certain degree of bad taste in over-decorating a mere business building, and the practical result is that the tenant of the office has to pay a higher rent to cover the outlay on all this decoration. He would get a better return for his money

if he were to pay the same percentage for decoration to his house rather than outside his office; I say *outside*, for I notice that many of these handsome offices are but whited sepulchres, dingy enough inside. It is to our town dwelling houses that we want most to see the province of architecture extended. We have to see whether, by combined attention to sanitary construction and appliances, and to picturesque and solid architectural treatment, we can, without disproportionate expense, render our town life somewhat more pleasurable and less depressing in aspect than it is at present. But public interest in this matter, and public co-operation therein, must be called into existence, before there can be a chance of realising the state of blessedness depicted by the Psalmist—"that there be no complaining in our streets."



## THE APPROACHING TRANSITS OF VENUS IN 1874 AND 1882.

By RICHARD C. JOHNSON.

THERE has recently been a great deal of interest manifested in the question of the sun's distance from the earth.

During the last twelve or fifteen years the approximations obtained by a variety of methods have confirmed the belief, then first entertained, that the result, deduced by Encke from the observations of the transits of Venus in 1761 and 1769, was erroneous to an extent that causes a diminution in the sun's mean distance of about 3,000,000 miles. Of these methods, perhaps the most important are the four following :—

1st. Observations of the parallax of Mars when in opposition.

2nd. The calculation of the difference in the perturbation of the moon by the sun, when in those parts of its orbit nearest to, and furthest from, the sun.

3rd. The disturbing action of the sun upon the centre of gravity of the earth and moon. And,

4th. The determination due to the velocity of light.

These methods are so diversified that the accordance of the results derived from them (especially that by the velocity of light, which has a distinctive character, rendering its agreement with the others most important) necessitates their adoption ; and it has also been confirmed by a re-discussion (by Mr. Stone, till lately the First Assistant at Greenwich Observatory) of the observations from which Encke's result was obtained ; this we shall have occasion to notice again.

The distance deduced by Encke was 95,360,000 miles; and although at first sight an error of 3,000,000 of miles appears a gross one, it is not so really; for Encke's value of the solar parallax was obtained by putting a certain construction upon the behaviour of Venus when in contact with the sun's limb, which we now know ought to have been differently interpreted.

The sun's distance is the unit of celestial measurements, for upon it depend not only the diameter, volume, and mass of the sun, and the diameter, volume, mass and distance of each of the planets of the solar system, but also it is the measuring line by which we estimate the distances of those almost infinitely more remote bodies, the stars.

On this account, therefore, it is eminently important that the closest possible approximation to this distance should be obtained; we say approximation, for an exact determination is an impossibility, if we consider that an error of only one-tenth part of a second of arc in the observation of the sun's parallax makes a corresponding error in the sun's distance of about 100,000 miles.

The measure which it is necessary accurately to determine, in order to calculate the sun's distance, is the diameter of the earth as seen from the sun, or rather the value of the angle included by two lines drawn from the centre of the sun, tangents to the earth's circumference; this measure, for convenience of application (see Plate I.), is referred to the angle included by two lines drawn from the centre of the sun, one to the centre of the earth, and the other to its circumference; and the mathematical expression for this quantity is the sun's mean equatorial horizontal parallax.

Parallax literally means displacement; and it is evident that if, from opposite points on the earth's surface, we could measure the distance by which the sun would be displaced upon an infinitely remote background, it would measure the

# PLATE I.

Fig.1

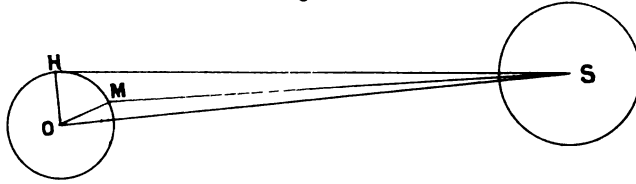


Fig 2

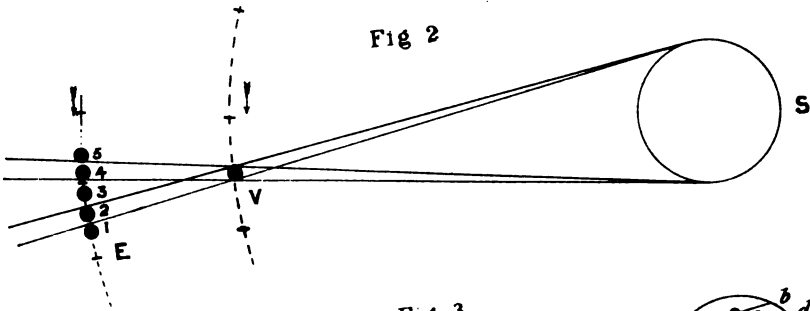


Fig.3.

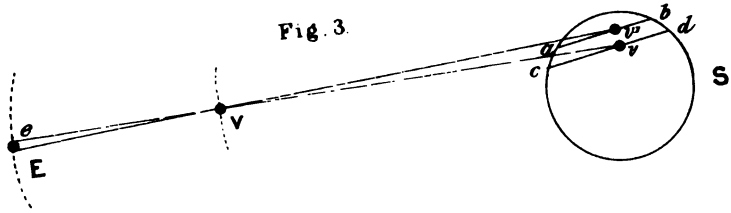
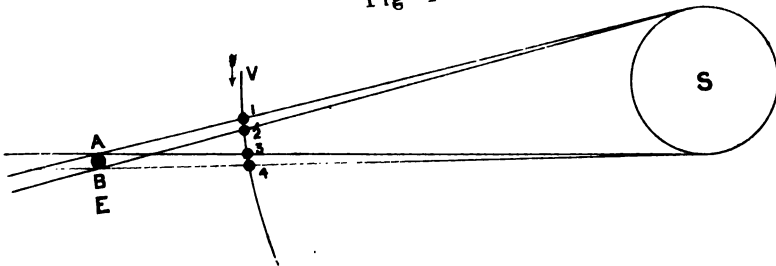


Fig 4



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same angle that the earth's diameter subtends from a point upon the sun's surface.

Parallax, which amounts to nothing on a meridian, is the greatest when the sun is on the horizon of the place at which the observation is made (see Plate I., Fig. 1); and the earth's equatorial diameter, which is greater than the polar, is always referred to; and as the earth's distance from the sun varies, observations are reduced to the mean distance. It is usually called the sun's parallax, and will be so termed whenever necessary in this Paper.

It is manifest that, owing to the brightness of the sun, it is not possible to observe directly the amount of his parallax, for there is no visible background to which we can refer our measures, so we must employ some other means of determining it.

Mars, which approaches nearest to the earth of the superior planets, affords us usually the best means of making this determination; for, on account of the eccentricity of his orbit, he sometimes comes within 26,000,000 of miles of the earth; and being a superior planet when in conjunction with our earth, he is situated in a dark part of the sky, so that it is easy to measure his parallax among the stars.

Now it is evident that the parallax of Mars, as viewed from opposite extremities of the earth, will be about three times that of the sun; hence, other things being equal, an observation of his parallax will have three times the weight of that of the sun, supposing for the moment that such a direct observation were possible, for the error of observation will be the same, and it will only affect the result to one-third the extent.

The planet Venus approaches nearer to the earth than Mars, and has therefore a proportionately greater parallax; therefore, when we have the means of obtaining it, we have then the very best possible opportunity of determining the



distance of the sun ; but there is a difficulty in utilising it that renders it totally inadmissible, excepting during the rare occurrence of a transit of the planet across the sun's disc ; and the difficulty lies in this, that, the orbit of Venus being within that of the earth, it only arrives at conjunction with the earth at such time as it is in the immediate neighbourhood of the sun, and it is therefore as impossible to measure its parallax directly as that of the sun. If the orbits of the Earth and Venus were in exactly the same plane, there would be a transit of the planet every time that it arrived in inferior conjunction with the sun, but they are inclined to each other about  $3\frac{1}{2}^{\circ}$ , and it is only at long intervals that we are favoured with the opportunity of making use of this method.

The intervals recur at periods of 8,  $121\frac{1}{2}$ , 8,  $105\frac{1}{2}$ , 8,  $121\frac{1}{2}$ , &c., years, and so on ; but there are occasional exceptions to this rule, for when one of the transits happens to be across the centre of the sun, at the conjunction in eight years after the planet will not be near enough to the sun to touch the disc. The two previous ones occurred  $105\frac{1}{2}$  and  $113\frac{1}{2}$  years ago, viz., in 1769 and 1761, and the transits before these, in 1639 and 1631.

The knowledge of the parallax of the planets Mars and Venus would be of no value in the determination of the sun's distance, but for the application of the remarkable law, which Kepler discovered, between the periodic times and the distances of the planets, which is thus expressed :—

The squares of the periodic times of the planets are proportional to the cubes of their mean distances.

From this law it follows that the relative distances between the sun and all the planets in the solar system are very accurately determined ; and that if the absolute distance that separates any two can be discovered, it would then be easy to settle the absolute distances of all.

Kepler, to whom Astronomy is so immensely indebted, was the first to predict a transit of Venus ; and the first one which he predicted passed by unobserved, in 1631, because it was not visible in Europe owing to its happening on the night of the 6th and 7th of December. This transit was announced by Kepler to be the only one that would happen during the seventeenth century.

But another transit occurred in the year 1639 ; and it is on account of the remarkable sagacity which a Liverpool man and a friend of his exhibited in their calculations, that this transit is made of special interest to us.

I believe that the history of Jeremiah Horrocks has been related in this Society, and is well known to some of our members ; so I shall now merely state that he was born in Toxteth Park, and, after being educated at Emanuel College, Cambridge, lived at Hoole, near Preston, where he was, according to some accounts, a hard working curate, and devoted a deal of his time to astronomical pursuits. These were also shared with a friend named Crabtree, who lived near Manchester, who also managed to get a glimpse of this interesting phenomenon.

Horrocks was led to the conclusion that a transit would take place in 1639, by a comparison of the tables of Venus calculated by Kepler with those of Lansberg ; and as he found that, according to the former, at conjunction Venus would be a little below the sun, and to the latter, that she would just touch the western limb, he concluded that a transit was possible, and proceeded to ascertain by his own calculations that a transit would occur, probably on the 24th November, o.s. The day fell on a Sunday, and it shows a most interesting trait in his character, that he was so much divided between his allegiance to his religious duties and to science, that he felt himself compelled to attend to the former even at the risk of losing sight of such a precious

phenomenon. However, he was adequately rewarded; for, upon turning his telescope to the sun, and receiving the image on a sheet of paper, in a darkened chamber, at 3.15 in the afternoon, he had the unspeakable pleasure of beholding the planet projected upon the sun's disc. In his own exulting language he says, "At this time an opening in the clouds, which rendered the sun distinctly visible, seemed as if Divine Providence encouraged my aspirations, when oh! most gratifying spectacle! the object of so many earnest wishes, I perceived a new spot, of unusual magnitude, and of a perfectly round form, that had just wholly entered upon the left limb of the sun, so that the margins of the sun and spot coincided with each other forming the angle of contact."

He only observed it for about half an hour, when the sun set, and was not, of course, able to make any useful observation, if, indeed, even the possibility of doing so had occurred to him.

Upon the suggestion of Halley, important expeditions were sent out to observe the next transits, in 1761 and 1769; the first one was but moderately successful, the second completely so; for from the observations which were made at the different stations then selected, was deduced the value of the sun's parallax, 8.6 seconds, which has been accepted as the best for nearly a century.

Both these transits were observed from stations so chosen as to utilise the methods of observation proposed by Halley and Delisle; but as in the transits of 1874 and 1882 similar methods of observation will be practised, it is not necessary further to refer to them here.

From what has been already said, it is apparent that there is no astronomical occurrence which places in the hands of the mathematician so powerful a means for solving the question of the sun's parallax as a transit of Venus. It is for this reason that, so long ago as the year 1857, the Astronomer

Royal directed attention to the necessity of early preparation for the proper observation of the transits of 1874 and 1882; and in December, 1868, he brought the matter before the Royal Astronomical Society in a very complete manner, having made all the preliminary calculations, and prepared the plans of the requisite expeditions. The Government immediately granted the sum of £10,500 for the observation of the former of these transits, which will doubtless, if found necessary, be supplemented with further material aid when the time arrives.

It is not our object to enter into a very minute mathematical account of the theory of the transit of Venus, for although in itself it is simple enough, yet there are involved in the complete enunciation of it so many intricacies, that it would require more time than is at our disposal, especially as those who are sufficiently interested in the subject can easily enter into it for themselves.<sup>1</sup>

By a reference to Fig. 2, Plate I., in which S represents the Sun, and V and E small portions of the orbits of Venus and the Earth, which move round the sun in the direction indicated by the arrows, and with a relative speed which is shown by the barred spaces on the dotted line, it is apparent that the shadow-cone of Venus overtakes the earth in her path; and the following phenomena occur in the same order as if the earth passed through in the contrary direction. At 1, the first external contact of Venus with the sun's limb; at 2, the planet will appear to be just wholly upon the sun's disc, and this is the phase of first internal contact;

<sup>1</sup> I would recommend any one, who wishes to have a clear and comprehensive view of the whole subject, to read Mr. Proctor's excellent Paper in the monthly notices of the Royal Astronomical Society, for the year 1868-9, and also the Appendix to his recent work upon the Sun. It is to these Papers, as well as to some others in the Proceedings of the Royal Astronomical Society, that I am chiefly indebted for the substance of this Paper. The map which accompanies this Paper is constructed from Mr. Proctor's charts in the Royal Astronomical Society's monthly notices. .

at 3, Venus will appear in central passage; at 4, the phase of last internal contact takes place, the planet then being just wholly within the sun's disc previous to passing off; and at 5, the instant of last external contact is that of the termination of the transit.

There are two well-known methods of determining the solar parallax from these observations, called by the names of those who first applied them, Halley's and Delisle's.

Halley's is the simpler, so we will consider it first.

In Plate I., Fig. 3, we see the direction in which Venus would appear to be projected on the sun's disc when viewed from opposite diameters of the earth.

In order to calculate the sun's parallax, we must know the exact amount of the displacement of Venus at the time when she is nearest to its centre, when seen from two stations on the earth, as far removed from each other as possible, that is, the distance  $V^1v$ . But this it is very difficult, nay impossible, to measure directly; for, in the first place, the displacement, *per se*, is very small; and, secondly, it would be necessary to take both observations at the same moment, or that their difference in time should be known to a single second, and for that purpose the most accurate determination of the longitudes of the selected stations would be needful.

But by using Halley's method, several of these requisites are dispensed with; for by changing the determination of distance into that of time, by noting the exact duration of the passage of the planet across the sun's face, it is easy to ascertain the length of each of the chords  $a b$ ,  $c d$ , and consequently the distance which separates them,  $V^1v$ .

This gives the value of the angle included between the lines  $V V^1$  and  $V v$ , which is the same as the angle  $F V e$ , and we can measure  $E e$ , so it is easy to obtain the value of  $E V$ ; and, then having found the distance of Venus from

the earth for the given time, to ascertain the mean distance ; and by the application of Kepler's third law to find the mean distance of the sun.

The problem is presented free from an innumerable quantity of disturbing elements, which in practice have to be dealt with.

In order to utilise this method of observation, it is necessary to select such places that from each the whole of the transit shall be visible ; for the rotation of the earth during its continuance causes some places at which the commencement was visible to set before the conclusion, and also some places at which the end is seen have not risen at the time of commencement.

But as the places selected for stations must be as far separated in latitude as possible, another serious question is that of the habitability of the winter stations ; this is not so important in the ensuing transits as it was in the two preceding, for it will, both in 1874 and 1882, be the northern winter at the time, and there are more available places of observation in that hemisphere than in the southern ; but in 1882 there will be considerable difficulty in obtaining sites in the southern hemisphere, for it so happens that the sun will be on the meridian of those parts, which are nearly in the centre of the South Pacific Ocean (see faint + 's on map).

Delisle's method, though quite as simple in theory as Halley's, is more difficult in practice, for reasons which will be readily understood in the explanation of it.

In Fig. 4, Plate I., instead of representing the earth passing through the shadow of Venus, as we did in Fig. 2, Venus is represented overtaking the earth, and the following phenomena ensue.

When Venus arrives at the spot marked 1, it is evident that an observer on the earth, situated at A, would see her

half way on the sun's limb, or in central contact ; by the time she had arrived at 2, another observer at B would then just see the same phase. At 3, the observer at A would be the first to see her just half way off the sun's limb, or in central contact, for the last time ; and lastly, at 4, the observer at B would witness this phase.

These observations are thus utilised : The times at which the observers at A and B respectively see the contacts (at 1 and 2) completed must be particularly noted ; the difference between the two is the length of time that Venus requires to pass over so much of her orbit as is included between these two lines ; then, as the distance between A and B is known, the distance between 1 and 2 is easily calculated, because it bears the same proportion to A B that the distance of the earth from the sun bears to that of Venus from the sun ; we know the time that is required for Venus to complete one revolution round the sun, if then we divide it by this observed time, and multiply the quotient so found by the value found for the distance between 1 and 2, then the circumference of the orbit of Venus is ascertained, and from that, by Kepler's third law, the radius or distance from the sun.

The same observations can be made of the other two phases (3 and 4), and thus additional weight given to the result.

Delisle's method is certain to be carefully applied to the forthcoming transits, not only on account of its own inherent merits, but because by it advantage is taken of stations that are totally useless for Halley's method. The greater the number of stations, the less risk there is of bad weather interfering with the observations.

If we refer to Fig. 2, we shall see that it is necessary to calculate accurately what parts of the earth's surface are turned towards the sun during its passage through the shadow-cones of Venus.





large as possible, and yet that the sun's altitude shall be so great as to render the observational part with the telescope successful. These places are found to be between the lines which show an altitude of the sun of  $15^{\circ}$  to  $30^{\circ}$ .

By a reference to Fig. 5, Plate II., it will be seen that there is an arc of about  $6^{\circ}$  between the angles of external and internal contact, both at ingress and egress; and the difference in the choice of localities which Mr. Proctor has proved to be the best, and those which were selected by the Astronomer Royal, arises from the fact that the latter based his calculations upon the times of external contact, whilst the former based his upon the times of internal contact.

It is the phase of internal contact that will be timed everywhere; and Mr. Proctor found, upon recalculating the localities best suited for observing this phase, that there was an error of upwards of 700 miles in one of the sites chosen by the Astronomer Royal.

It was also considered by the Astronomer Royal that the special circumstances of the transit of 1882 were much more favourable for the application of Halley's method than were those of 1874; and here again Mr. Proctor has conclusively shown that the opposite is the fact, viz., that the transit of 1874 is a very much more favourable one for Halley's method than is that of 1882; and, indeed, that unless our knowledge of the Antarctic region is considerably increased, it would be madness to risk an expedition in the only parts that would be of any service; and that, taking all the circumstances of the cases into consideration, the best results are to be expected from the former of the transits.

In the commencement of this Paper, the fact was referred to of the perplexity which the behaviour of Venus, in breaking contact at ingress, and in making it at egress, occasioned to the observers of the transits of 1761 and 1769, and to the

# PLATE II

Fig 5.

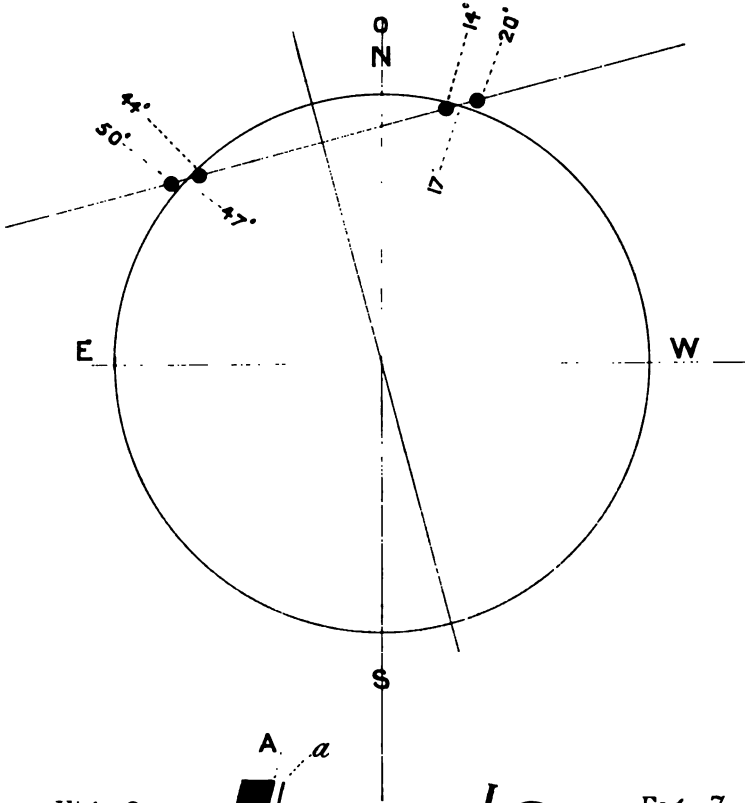
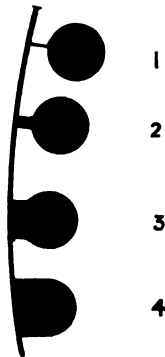


Fig. 6



Fig 7.





fact that a very important error had in consequence crept into the resulting parallax. And we know, from the observations made at Greenwich and elsewhere of the transit of Mercury in 1868, that it is not owing to any imperfection in the telescope or defect of vision, but that it is a necessary accompaniment of the phenomenon.

It is well known that when a bright object is observed in the telescope, it has an apparent disc larger than its true disc, and that when a dark object is observed, its apparent disc is smaller than the true. The knowledge of this law is at the foundation of the interpretation of the appearances presented, when the black body of Venus approaches to, or recedes from, the bright limb of the sun.

Fig. 7, Plate II., exhibits the appearances which different observers have described (Nos. 1 to 4).

1. When the planet is yet at some distance from the limb, its shape remaining undistorted, a fine line suddenly bridges the interval.

2. Shows a phase which occurs a few seconds later, and is often the first to be seen owing to the unsteadiness of the air.

3. A still later phase.

At 4, is seen the shape of the ligament when the planet would appear to be in contact, if its shape were preserved until the time at which this phase is presented.

When the observations of the transits of 1761 and 1769 were reduced, this was the most perplexing part of the determination; for between the appearances presented in Nos. 1 and 4 an interval of time of about eighteen seconds elapsed; and as an error of only two or three seconds in the determination of the time of contact would render the result altogether useless, it becomes of the utmost importance that a correct interpretation of these appearances be made.

The phase presented in No. 4 is that of apparent con-

tact of the limbs ; for if the circular outline of the planet was completed, it would here just touch the sun's limb, and the phase represented in No. 1 is that of actual contact ; for according to the law just stated (see Plate II., Fig. 6), if *A B* is the apparent edge of the sun's disc, then *a b* would be the true edge on account of the increase of apparent size of a bright body ; and as the black disc represents the apparent size of Venus, so the fine exterior circle shows the real size, and thus the drawing represents the phase of actual contact ; and it is just at this time that the very fine line, shown in Fig. 7, No. 1, is formed.

In order to catch the exact time that this line is formed, or broken, good definition is necessary ; and in this lies one of the chief barriers to the success of the expeditions, for at all the stations the sun will be low down in the sky, and consequently the sun's limb (which is at all times difficult to define) will present the troublesome rippled appearance so well known to observers.

However, complaint is useless ; astronomers have long been accustomed to grapple with almost overwhelming difficulties in their endeavours to wrest the secrets of the universe.

A transit of Venus affords the opportunity for the application of photography, in which there are perhaps more elements of success than in any other of the various ways in which it has already been successfully employed for astronomical purposes.

It has been used for depicting the light and shade of our comparatively dim satellite ; for mapping the fixed stars, of magnitudes so minute that a telescope is necessary to render them visible ; for recording the transient phenomena of a total eclipse, in which the corona and red prominences have each told their tale ; and it seems that there cannot be a

more eligible occasion for its application than during a transit of Venus.

Mr. Warren de la Rue has ably stated the case to the Royal Astronomical Society, and has, I think, proved that it is possible that photographs, of which quantities can be taken at any station, may afford the means of obtaining a most accurate determination; and there is certainly this advantage, that the plates or negatives taken will be available for all sorts of measurements and after-discussion; and that the occurrence of certain mistakes to which eye-observation is liable would be rendered impossible.

I think that perhaps the chief source of error in a photograph is the possibility of the contraction of the film,—which is wet when the negative is exposed,—when dry. This might be altogether avoided by the use of dry plates, which can easily be made more than sufficiently sensitive, and which have also the advantage of being used without the trouble of immediate preparation beforehand.

It is hardly necessary to enter into particulars about the best localities for observing the transit of 1882, for it is possible that when the arrangements that are to be carried out in 1874 come to be rediscussed, in the preparation for 1882, the wisdom gained after the event will cause alterations that may considerably modify the plans.

Two faint crosses are placed on the map to indicate the localities of mean ingress and egress, from which it will be seen that almost similar phases to those of 1874 will occur at places situated about twelve hours, or one-half of the earth's circumference, apart, towards the west of those chosen in 1874.

It may have been thought that it is rather early to bring this subject before the notice of this Society, but when it is remembered that after 1882 this event will not recur till the lapse of  $121\frac{1}{2}$  years, *i. e.*, in June, 2004, I think it is

hardly possible that too much attention can be devoted to the consideration of the question, especially as it is hoped that the result obtained from the observations of 1874 and 1882 will be so conclusive as practically to bring to an issue the question of the earth's distance from the sun.

## MADEIRA AS A SANATORIUM.

By WILLIAM UNWIN.

FASHION has doubtless its advantages and conveniences, but it has also its disadvantages and inconveniences; it sets up one place as a resort for invalids, and puts down another apparently without rhyme or reason. At one time all the world of fashion crowds to Blackpool, at another it flocks to Scarborough; and so it has been with the resorts for patients suffering from different affections. At one time it is to Münster and Kreuznach, and at another it is to Karlsbad, Leukerbad or Wiesbaden, that sufferers from skin diseases are sent. And so it has been with the resorts for the sufferers from pulmonary diseases. At one time, Madeira was the favourite place, then came Nice, then again Algiers, and other ports first on this side then on the other side of the great basin of the Mediterranean; and the reason for the change of place, with many, was simply fashion. But to a discriminating practitioner, every one of these places will doubtless have its turn, according to the nature of the disease and temperament of the invalid; but unfortunately, as it used to be with the Jews that all were not considered Israel that were of Israel, so now with men of science; they are not all scientific that are of the learned professions; they do not all subject isolated observations to the process of thought, so as, by combining and comparing them, to be enabled to discover the climatic suitabilities to the constitutions and temperaments of their patients. Amongst professional men, there are many who have a tendency to form too hasty a generalisation; one or two facts suffice, with them, to establish a



conclusion. And so it has been with many medical men in either recommending or else condemning Madeira as a sanatorium for sufferers from that insidious and unrelenting disease, commonly known as consumption. And it is because, being connected by birth, and for many years engaged in commerce, with the Island of Madeira, and having always taken an interest in every thing that concerns it, that I have come by information which may not have reached the knowledge of every practitioner; and it is in the hope of directing the attention of those whose multifarious occupations have not allowed them the opportunity of making themselves acquainted with the facts, that I am emboldened to write a paper on Madeira. I have observed, for many years, so much unnecessary suffering inflicted on invalids, sent indiscriminately to Madeira, altogether arising out of ignorance of the peculiarities of its climate.

I had the privilege, in my younger days, of knowing Dr. Mason (perhaps better known as the inventor of the hygrometer bearing his name), during his temporary sojourn in the Island of Madeira. It is owing to that acquaintance that I have taken so much interest in all that concerns the climate and meteorology of that truly beautiful island. Dr. Mason, for all practical purposes of choosing a climate or judging of its suitableness to invalids, divides invalids into two classes of temperaments—those who require a dry, and those who require a humid atmosphere; and here, for convenience of being understood, I distinguish between a damp and a humid atmosphere. I would call our English climate a damp one, generally speaking, because we have so much rain; but, on the other hand, the Madeira climate I would call humid, because there, even during the months, say from May to October, when there is no rain, or scarcely any, there is nevertheless a strong evaporation from the sea, owing to the effects of the north branch of the Gulf stream which encircles the

island. Those who can stand and like the dry air in one of our Turkish baths, or the atmosphere produced by the heating of a room by an iron stove with a great surface of iron, should *not* go to Madeira; but, on the other hand, those who are distressed when so circumstanced should seek its balmy air. I will quote Dr. Mason's own words.

"With regard to individuals who labour under certain diseases, which would be aggravated by a considerable evaporation from the surface of the lungs or skin; we see the propriety of a change to a warm and humid climate like Madeira, where pulmonary evaporation would be impeded; as such individuals always suffer from the cold of our winter, which in their cases produces the same effect as excessively dry air. It is proved that large quantities of fluid, received into the stomach, will not remedy the effects of that rapid exhalation from the lungs which is produced by air, either cold or excessively dry. Thus, of a necessity, a mild humid air will place the patient under those circumstances which are the most favourable to his recovery. If this cannot be done by change of climate, the evil ought to be obviated, as far as possible, by resorting to artificial means. The atmosphere in the immediate vicinity of the patient ought to be rendered humid by maintaining a sufficient evaporation from water, whereby, the air being rendered moist, the too rapid desiccation of the respiratory organs will be not only modified, but arrested, in consequence of vaporous absorption. It will also be necessary to place the patient in a temperate atmosphere, for if that condition be neglected, it is obvious that, although the air be saturated, nevertheless, if it be cold, it will not produce the desired effect; as with regard to pulmonary exhalation, it will operate in precisely the same manner as dry air."\*

\* *A Treatise on the Climate and Meteorology of Madeira*, by the late J. A. Mason, M.D.

It was just said above, that Madeira has a humid, in contradistinction to a damp climate, because the air is at all times moist, though little or no rain falls from May to October; and, what may appear still more strange, is that all the springs, fountains and wells continue well supplied during the whole of that long droughty season. Doubtless the evaporation from the sea, which is much increased by the presence of the Gulf stream, is condensed on the leaves in the form of mist, and the continual dropping no doubt very materially contributes to the water supply. In fact, at one time, there was a municipal law which forbade the cutting of a *vinhatico*, the Madeira mahogany tree, for in the island there was a belief that the cutting of a *vinhatico* dried up a spring. And were it not that the atmosphere is nearly saturated (only about  $34^{\circ}$  off saturation, computed at  $100^{\circ}$ ), it would be impossible for vegetation to flourish, when there is scarcely a shower, for, in some years, six months in succession. Writers on the climate of Madeira are generally agreed, that rain falls about seventy-three days in the year, on an average of years although in some exceptional years the number reaches to one hundred days. Dr. Graham computes the annual rainfall at twenty-nine inches. There are considerable variations; in some years the whole amount has not reached twenty inches, whilst in others it has reached forty inches; but something between twenty-five and thirty would be perhaps the correct quantity.\* But it is to this atmosphere, containing aqueous vapour to so great an extent and yet so little variation, that the equableness of the climate is owing. Madeira, however, is not entirely exempt from the vicissitudes of weather, as that depends on meteorological changes, which alter the course of the winds; but, as a rule, the climate of one season is very

\* *The Climate and Resources of Madeira*, by Michael G. Graham, M.D., F.R.G.S.

much like the climate of the corresponding season of another year. Many people, speaking of Madeira, speak of it as they feel it and believe it to be --- a perfect climate, a paradise; but the observations of Dr. Mason have proved its humidity, the existence of which the inhabitants never dreamt of; and doubtless owing to that warming hydraulic apparatus of Europe, the Gulf stream, to which we owe even in England, on the south and west coast, much of the mildness of the climate. Sir James Clark says, that the mean annual temperature of Funchal is  $64^{\circ}$ , being only about  $5^{\circ}$  higher than the Italian and Provençal climates. This very moderate mean temperature, relatively to its latitude, arises from the circumstance of the summer at Madeira being proportionally cool; for whilst the winter is  $20^{\circ}$  warmer than in London, the summer is only  $7^{\circ}$  warmer; and whilst the winter is  $12^{\circ}$  warmer than Italy or Provence, the summer is nearly  $5^{\circ}$  cooler. The mean annual range of temperature is only  $14^{\circ}$ , being less than half the range of Rome, Pisa, Naples and Nice. The heat is also distributed throughout the year with surprising equability, so that the mean temperature of successive months is only  $2^{\circ}.21$ ; this at Rome is  $4^{\circ}.89$ ; at Nice,  $4^{\circ}.74$ ; at Pisa,  $5^{\circ}.75$ , and at Naples,  $5^{\circ}.08$ . When we take into consideration the mildness of the winter and the coolness of the summer, together with the remarkable equability of the temperature during the day and night, as well as throughout the year, we may safely conclude that the climate of Madeira is the finest in the northern hemisphere. The difference between summer and winter in Madeira is  $9^{\circ}$ , whereas in London there is a corresponding difference of  $23^{\circ}$ , (and that difference has been experienced within two or three days, in the months ranging from March to November), and at Mentone,  $24^{\circ}$ , at Cairo,  $20^{\circ}$ . The mean annual temperature of Funchal is calculated to be  $67^{\circ}$ .

Parkes, on Practical Hygiene, expressing the degrees of

moisture as a per centage of 100°, which is the number assumed to represent complete saturation, says, that in Funchal, taking the mean of the whole year it is 76°, and that the most agreeable amount of humidity to healthy people is between 70° and 80° per cent. The absolute humidity of the atmosphere decreases sensibly with the ascent from the sea level, so that the climate may be regulated to suit the patient. There are hotels and furnished cottages at all altitudes in the hills surrounding Funchal, within a radius of three miles; and not only in the neighbourhood of Funchal, but at almost every interesting village or hamlet all over the island, each with a different climate, according to its situation and aspect, and the altitude from the sea. The mean maximum degrees of dryness for the winter season is 4°.13; for the spring, 5°.56; for the summer, 5°.96; for autumn, 4°.60, and for the whole year, 5°.05.

Egypt has come into vogue of late years as a resort for invalids suffering from phthisis, commonly known as consumption, and it would be well to show the difference of the two climates. Egypt is excessively dry at Cairo, and at other abodes up the Nile. It is doubtless suitable to invalids of the temperament already spoken of—those who can stand and enjoy the atmosphere of a small close room, with a lighted iron stove in it having a great surface of iron. Our townsman, Mr. Charles Clark, who visited Egypt in the capacity of the President of the Chamber of Commerce, on the occasion of the opening of the Suez Canal, says, “There is something delightfully exhilarating in the air of the desert; so warm, so pure, so dry, it seems to act like a tonic upon body and mind, soothing the brain, and making the mere sense of bodily existence a refined pleasure.”\* But on the other

\* See *Notes from my Diary in Egypt*, a Paper read before the Liverpool Philomathic Society, on the 30th March, 1870, by Charles Clark. Webb, Hunt, and Ridings, Liverpool.

hand, Dr. Patterson, who is a resident physician in Egypt, finds it so dry to some constitutions, that he recommends the introduction of moisture into the air of the apartments, and further advises patients not to come straight on to Cairo, but to stay a few days at Alexandria.

Then, again, the range of the temperature is much greater in Egypt than in Madeira. In Egypt, on the 29th December, 1867, at the morning observation, the thermometer was at 52°, and at the noon it was at 72°, showing a range of 20°, whereas in Madeira, the range is only about 7° to 8°. Both countries are subject to hot dry winds. During the Lest (East) wind in Madeira, the range is about 12° to 13°, whilst during the Khamseen in the desert in Egypt, the range is about 50°. Lest I should be suspected of exaggeration, I will quote Dr. Patterson's own words. "This day (in May) gives a full idea of the variations at such periods; at 6 a.m., the mercury stood at 54° F.; at 9 a.m., 78°; at noon, 107°; at 6 p.m., 94°, the greatest difference being 53° Fahrenheit. Dr. Patterson informs us, that in Egypt the temperature falls sufficiently low at times for ice to have been found in the desert as late as February. And Niebuhr says, that his servant found one morning a piece of ice on a cabbage at Cairo. Madeira is not subject to fogs at any time of the year, but Egypt is after the inundations of the Nile. The houses fitted up for the reception of invalids, at Funchal, are provided with fire places in the sitting rooms, and have all those other conveniences and comforts of an English home, whilst Egypt has them not; it is a rough and ready sort of place, I believe. Mr. Clark says, there is little in Alexandria to compensate the passing traveller for the discomfort he undergoes.



## SHOULD THE NATURALIST RECOGNISE A FOURTH KINGDOM IN NATURE?

BY REV. W. H. DALLINGER, F.R.M.S.

SCIENCE can be conservative of nothing but truth. Its final appeal must be to *facts*. As the interpreter of Nature it has no power to do other than disclose her disclosures. However disruptive of received truth or disturbing to old foundations its discoveries may be, science is bound to bring them to the front. It has no more to do with harmonising its facts with theory or creed in realms outside itself, than it has to do with industriously endeavouring to prove that they cannot *be* harmonised. Its work is simply and alone, with rigid exactness, to read the *facts* of Nature.

But this course is not evenly pursued; profound and eager students of Nature, not content with interpreting to us the latest sentence of the great instructor, interpolate, and tell us what they think the following sentences will be: at times, 't is true, with a splendid penetration; but in the main it darkens counsel, and we are called upon ever and again to disentangle the mesh, to separate the known from the supposititious, the real from the ideal.

In no field of thought, no region of enquiry, have we a more dazzling array of facts, or a more brilliant stream of speculation, than in the science of Biology. In its most comprehensive meaning it is the resultant of *all* the sciences. Excepting Astronomy, it lays embargo upon them all, and presents a width of area for minute enquiry which admits of no parallel. On the one hand, it bears us out into the



mysterious border land between the living and the dead; and on the other hand, it seeks to grapple with the cause and conditions of the highest consciousness and thought. Mind is so constructed that it cannot, will not, rest in bare fact. "Fact" must have a place, a meaning; and if this cannot be given it must be correlated to theory. And therefore it is that as Biology is so affluent in ever new and brilliant *facts*, it is so prolific of speculation and anticipative interpretation, which is not unfrequently conflicting, and often abortive.

It is life in its lowliest developments that has of late claimed the attention of the student—life on the border land. Armed with the latest triumphs in optical art, and his eye educated as an interpreter of microscopical teaching, the student has had a new world disclosed; and here the old land-marks are being constantly removed. By some it is hoped that the problem of life itself may be tracked to its goal here, and its most intricate phenomena distinctively explained.

Now it is in this region of enquiry that the seeming impossibility of sharp demarcation between the several kingdoms of nature most strikingly presents itself. There are forms that in our present state of knowledge we unhesitatingly call animal, which are strangely "mimiced," if not actually repeated, by stages of other forms, which we as unswervingly call vegetable. But more, it has been thought by some observers that there is a realm disclosed which is neither animal nor vegetable, but distinct from either. Haeckel, the great German Biologist, has carefully studied these; he considers them absolutely distinct; he contends that they are marked by non-sexual reproduction, that they form a *Kingdom*, and thus assuming the borders of the Mineral Kingdom definable; next it, sharply demarked, comes Haeckel's New Kingdom—Protista. Then follows

the Vegetable Kingdom, whose borders, we are told, will be distinct ; and after this the Animal, which by this division we are promised may not be mistaken.

I purpose concisely to investigate the principles on which this division is made, and to endeavour to approximate to their value.

Of course there can be no inherent objection to a fourth kingdom in Nature ; indeed, if it can be shown to be incident with the *facts of nature*, there is the highest reason for its adoption. But if it be merely an expedient to get over difficulties which at present defy us, why then its adoption would be folly.

The limits of the Mineral Kingdom appear in the present state of our knowledge not especially difficult of definition. It is not enough to say that inorganic substances never *live*, inasmuch as that assumes a definition of *life*, clear and distinct. They are composed of many elements, which may be simple (according to the evidence of our present powers of analysis), or combined. The combinations are limited to a small number of elements, and these are usually united in low combining proportions. They may exist in all the conditions intermediate between solid and gaseous, and are composed of an aggregation of homogeneous parts which may bear no fixed relations to each other, save the inherence of common properties. They *increase* only by the addition of like particles from without, additions to the external surface ; while their form may be amorphous and instable, or geometrical and fixed ; their boundaries being invariably plane surfaces and right lines. They themselves originate within themselves no motion or change. Internally they are absolutely at rest. Their atoms are only set in motion by forces from without. For aught we know to the contrary, a crystal of quartz, freed from all external influence, would remain unchanged for ever.

On the other hand, organised bodies are subject in every part of their being to incessant and tireless *change*. To say that an organised being *lives* is inefficient, since no definition of life has been advanced; but internal activity and change are in such constant operation as entirely to distinguish them. They increase by the imbibition of heterogeneous matter from without, and its assimilation within. Molecular alteration constantly ensues; old molecules which have been subjected to mutation are incessantly carried away, and new ones laid down in their place. An organised body is never homogeneous, its structural elements are compound; the combinations are complex, and the elements unite in high combining proportions. The combinations are characterised by the presence of water, and have a proneness to spontaneous decomposition. The direct union of two or more simple substances will never produce an organised body; it must arise from a germ—a portion separated from a vital organised being of its own kind—and as a consequence it passes through spontaneous and cyclical changes. Hence it has a definite shape, and the boundaries of this are curved lines.

Considering the antiquity of this division, and the intense refinement of modern research, these distinctions are strikingly clear. Still, it must not be forgotten that advanced Biology, at the instance of Chemistry and Physics, has raised difficulties and mooted explanations which have a tendency—whatever their *final* consequences may be—to unsettle this boundary.

First, the fact that internal molecular change and motion is a distinguishing feature of organised structure has been questioned. A soft iron rod, powerfully magnetised, expands; demagnetised, it again contracts; and at each change gives audible sound. From this molecular changes are argued.

If some strips of the metal palladium be placed in water,

and contact be made with a small galvanic battery, these strips of metal will roll themselves up into coils; some will vibrate, some will actually move forward, with a motion analogous to that of the common earth-worm. If the connections of the poles be reversed, there will be an instant reversal of the motion. These changes are caused by the metal palladium absorbing the hydrogen, set free by the dissolution of the water. This arrangement can be made automatic, but at length the metal loses its property of expansion and contraction. The cause of this has been shown by the microscope to be that great molecular changes have ensued; from which it is argued, that molecular change is not peculiar to organised beings, and that you can no more argue for a distinctive vital agency in the one case than in the other.

But I would submit that, in both these instances, the molecular change *within* is produced from *without*, and they are therefore invalid as argument. The molecular changes of organised bodies are automatic, and from within.

A more serious difficulty would arise, if, as has been asserted by some observers, it could be proved that the fluid existing in the cavities of some crystals is in constant motion. But the observations have been so few and imperfect, that they may be dismissed; while if the whole were proven it would be evidence of *motion* simply, not of *change*.

Probably a stronger case is made out, in the endeavour to show that morphous inorganic bodies are not of necessity bounded by right lines. It is said by Mr. Rainey, that if a solution of lime-salt and gum arabic be slowly decomposed, carbonate of lime is deposited in spheroidal concretions, assuming a dumb-bell or even a mulberry shape; while it is urged that organic deposition does not prevent it from assuming a crystalline form, as may be seen in the shell of the ordinary hen's egg.

But it must be remembered that the range of this doubt

is within the narrowest limits, and that it, in its turn, is surrounded by uncertainty and question.

On the whole, then, we may claim that there is an absolute and easily perceived distinction between organic and inorganic bodies, and that the Mineral Kingdom has clear limits.

But, in launching out from the inorganic kingdom, we immediately find ourselves face to face with the vast question, "What is life?" and to this, who shall give a competent reply? Even to suppose that "organisation" in the sense of the possession of distinctive organs is essential to life, is to shoot beyond the present bounds of scientific facts. The lowliest Protozoa perform all the functions of life without a single differentiated organ. Indeed, so enormous is the area, and so vast and profound the questions involved, that definition pure and simple seems impossible. It has been defined as "the sum total of the functions which resist death;" as "the constant uniformity of phenomena with diversity of external influences;" as "the special activity of organised bodies;" as "organisation in action," and many others. It is manifest, however, that these attempts are powerless to compass a tithe of the field. Indeed, the first great question for decision is, whether life be a *force* or a *property*; whether it be an entity distinct from organisation, but ever associated with, and acting upon and through it; or whether it be a mere property, a resultant from organisation.

The mere Chémico-Physical theory of vitality appears to me absolutely impotent to meet the just claims of the human mind. With what we know of the chemistry and physics of the laboratory, to predicate the building up of a living, conscious, volitional, thinking organism appears to be equal to predicating music from the laws of gravity. The phenomena of life in their higher aspects are absolutely inscrutable by the most subtle refinements of chemistry and physics. Take

one of the most constant attributes of life, irritability, and let either chemistry or physics give the semblance of explanation.\* A mere mechanical irritant of almost imperceptible magnitude falls into the eye, or attaches itself to the mucous surface of a bronchial tube, or finds its way to the tissues of the brain—its weight is nothing—no chemical change ensues in it; and yet it may excite such inflammatory action as will result in the death of the part, nay, it may be of the whole body itself. What force or property belonging to *unorganised* bodies will explain this? True, there are very many activities of vitality which are apparently explicable on solely physical causes; but there is always a vast residuum of unexplained phenomena. A man lifts a hundred-weight through ten feet in a given time; by the laws of conservation and correlation we are enabled positively to say that so much work cost so much equivalent expenditure. It is a mechanical act, explicable upon physical laws. But what are we to say concerning the *consciousness* that realised that it was lifting the weight, and the volition that decided to do it? How can you correlate these with physical laws when they have not an element in common? Show us that such an equivalent of chemical affinity will produce so much consciousness, so much volition in this or that direction, or so much thought, then the case will be altered. At present I hold that mere physical law is utterly incapable of producing, or even of explaining, vital action.

A theory, however, which, because it was immensely in advance of the chemico-physical science of its day, has until recently been suffered to drop out of notice, has remarkable claims upon our thought. It was mooted by Fletcher, a philosophical physiologist of immense research. On the one hand, he repudiates utterly the competence of the chemico-physical forces to originate or explain the phenomena of life;

\* *Life, and the Equivalence of Force.* J. Drysdale.

while, with equal force, he repudiates the existence of any force or vital agency, of either matter or spirit, which cannot be correlated with the known physical forces.

In other words, he considers life a *property* of organisation; a property inalienable, and originally impressed upon it by its Maker. It is by the properties of things alone that we can know them. It is the phenomena of properties that alone reveal them.\* We find that *living* organisms possess certain properties, and manifest certain known phenomena. We find that the same organism *dead* loses wholly these properties, and fails to manifest the phenomena. The argument, therefore, is that none of the so-called proximate principles, found in the organism when *dead*, existed in it when living; but that in their place there was "a peculiar combination isometric with the sum of these," and that it is the resolution of this into the proximate principles that is the act of *death*.

It is argued that you cannot analyse *life*; it is a property of organisation which directly you attempt to analyse you resolve into *death*. That, in other words, the *living* organism lies defiantly beyond us. It is a property of organisation quite unique—*sui generis*—which we call life.

Now it is well known that Dr. Lionel Beale has been working persistently for years at the ultimate structure of organised bodies, with the hope of finally obtaining a key to the mystery of life. With an eye educated microscopically, probably beyond any other in Europe, and armed with apparatus which have no rivals in the world, he has arrived definitely and fixedly at the conclusion that matter living and matter dead are absolutely and always dissimilar. That there is not even a gradient leading from the one to the other; they do not merge into each other. The line between living matter and dead matter is clear and abrupt. I believe

\* *Life, and the Equivalence of Force.* J. Drysdale.

the evidence which he brings in proof of his position to be of the clearest kind, and perfectly competent to the demonstration. But it needs an education like his own to appreciate it. The most philosophical physiologist, without an educated microscopical eye, would fail to appreciate his finest points. But there is scarcely a question but that living matter is wholly different in its properties from dead matter. Hence Beale's facts go far to prove Fletcher's theory. And together they appear to lead up to what would at least be a *consistent* explanation of a large number of the residuary phenomena of life which the chemico-physical theory has no power to touch. But here it must be observed that Beale and Fletcher diverge. Insisting as he does on the peculiar property of living organised matter, Beale nevertheless finds it incompetent to explain all the phenomena of the highest organisms; he contends that there are phenomena behind and above all the powers of this organic "property," which nothing *merely* material will explain. And I am bound to confess that it is only with such an understanding that I can perceive the possibility of a philosophical explanation of all the phenomena of life.

One of the results of the remarkable industry of Beale has been the discovery, that wherever life is found, in *any* of its forms, it is always associated with a peculiar proteine compound, with definite chemical components; in a word, that life inheres in, and is a property of, this compound. This has been called *protoplasm*; and a brilliant theorist has called it "the physical basis of life." Now if we take living protoplasm, and subject it to analysis, we get certain chemical elements, in certain definite proportions. But we have not analysed protoplasm, but merely its "proximate principles;" the act of analysis destroyed the life; and even that which we have analysed, chemistry has up to this time failed synthetically to produce. What, then, is our infer-



ence? Simply that the *vital* properties of protoplasm are not dependent upon a certain chemical combination of certain elements, but upon the possession of a certain *organic property*, impressed upon it by the Creator, and giving it that condition which we call "*living*." That the "physical basis of life" does not exist, in the sense of its being a property of the "protoplasm" of the laboratory; but that life, in all its phenomena, save the psychological, is a property peculiar to organisation, the resultant of the unknown and apparently inexplicable utilisation of the sum of properties, of which in death its components can be chemically proved to be possessed.

One thing at least is being daily more clearly established, and that is, that life is outside the pale of merely chemical and physical laws. And how wonderful the modes of its development! how infinite the varieties of its form! Its unity is absolute; and its diversity is equally clear. There are, however, two great groups of vital manifestation, which have been patent to observation in every age, and whose distinctive features appear sufficiently clear. Between the animal kingdom and the vegetable kingdom there seems to be little in common save the absolute possession of life; and yet the more industriously modern research labours to distinguish them, the nearer do their borders appear to approach.

One of the earliest distinctions between the vegetable and the animal was, that the one was permanently fixed to the soil, exhibiting in none of its parts any tendency to motion, whilst the other was always free, and vested with the power of volition. But early in the advance of science it was seen that there were definite animals, as the coral and the sponge, which were immovably rooted to the ground; whilst there were plants, as, for example, the *stratiotes aloides*, which become alternately rooted or free, as the exigencies of their condition may require. Whilst a more intimate

acquaintance with some forms of the vegetable world,—as, for example, the climbing plants, and the peculiar phenomena they display,—renders it almost certain that they must be endowed with some regulating motary function equivalent to that possessed by animals, when no nervous system can be discovered. But if we push our enquiry to the borderland, no distinction whatever can be seen; motion being as characteristic of the plant, in all its stages, as of the animal itself.

Even the phenomena of sensation are not without their apparent parallel in the vegetable world, as the sensitive plant (*mimosa pudica*) may witness; and as the peculiar irritability of the reproductive organs of some plants clearly show.

The fact that animals ingest their food through a stomach, while plants imbibe through the general surface of the body, was long held to be an efficient distinction; but it is now known that there are many animals having neither mouth, gullet, nor stomach; but in which pabulum for sustentation and waste-repair is taken in all over the body. While, on the other hand, a phenomenon equivalent to digestion is clearly displayed by the pitcher plants. In these plants, some of the leaves are modified into a ever shape; they contain a small quantity of some solvent solution; the margin of the mouth of the pitcher is covered by a viscid sweet, while surmounting the mouth is an articulated lid or cover. Insects are attracted by the sweet; the plant is sensitive; directly they touch the pitcher's mouth the lid falls, the insect is thrust into the solvent fluid, and the results of dissolution are absorbed by the plant.

The chemical differences between the vegetable and the animal are on the whole clear. A plant consists of *ternary compounds*, cellulose, dextrine, starch, &c. In the animal these are subordinate, the body being mainly composed of

albumen, fibrin, gelatine, &c. It is not long since this distinction was regarded as absolute. But it is now well known that starch and sugar are always present in the higher animals, whether normal or morbid. While chlorophyll, so distinctively vegetable, has been found in the bodies of both stentor and the green hydra, undoubtedly animal; and cellulose, the product of vegetables, has been found in the tests of ascidians.

Even the mode of reproduction is not a crucial test. Plants may be budded and propagated by division; so may many undoubted animals. It is well known that the divided hydra becomes *two*; while Haeckel, speaking of the *medusa*, says, "In several species of this family (the *Laodiceae*) I could divide the umbrella into more than a hundred pieces; and from each piece, provided it only contained a portion of the margin of the umbrella, grew in a few days (from two to four) a complete small medusa." And in addition to this, I think the whole tendency of recent research is to lead up to the fact, that both elements of generation are essential to reproduction throughout the entire vital series.

In intimate structure there is, in the more highly differentiated portions of these two great kingdoms, a marked distinction. Histologically, plants are homogeneous; they are composed of the cell, the cell-wall, and its modifications. But the tissues of animals are in the highest degree diverse. Yet even *structure* fails us as we trace it down; for it is, to our present vision, wholly wanting in the amœbæ, the flagellata, or the foraminifera.

Finally, in the elements appropriated to the sustentation of vitality, we have probably the broadest distinction. The only elementary substance a plant can assimilate is oxygen. Carbon, hydrogen, nitrogen, they can only assimilate when presented in the form of water, carbonic acid, and ammonia. The animal *cannot* utilise these. They must have been

elaborated into ternary and quaternary compounds. This is done in the cells of plants; they change them into starch, cellulose, sugar, &c. Hence plants live on *inorganic*, animals on *organic*, compounds. Yet this is not universal, for animals utilise inorganic substances, as salt; while there are parasitic plants, as the mistletoe, which are nourished wholly by the organic compounds elaborated by the plant on which they prey.

In elaborating their products, plants give off oxygen, animals carbonic acid; but this, like all other tests, has its limits. It is not true of certain fungi on the one hand, nor of certain lowly animal forms on the other.

It will be seen, then, that the border-land is in a pre-eminently debatable condition. There is not a single known distinction that we can carry to the end. And when we enter the field of the *minute*, when we travel with the microscope down into the *hidden* parts of nature, the difficulties become (at present) absolutely insuperable. Now among the teeming population of the stagnant pond there is ever readily discovered small, colourless, generally round, perhaps amorphous, masses of jelly. Under ordinary circumstances they are extremely minute. They may be motionless, or move in an amoeboid fashion. They display no structure, and apparently no differentiated parts. They multiply by division, or they become motionless, and break up, each fragment becoming eventually complete. Now these represent the *monera* of Haeckel, and form the earliest division of his new kingdom, the Protista. And we must now see whether it meets the difficulties of the naturalist on the one hand, and is coincident with the *facts* of nature on the other.

Haeckel has already himself modified his Protista; but the exact principles upon which his earlier classification was accomplished it is not easy to see. Speaking of the immense

difficulties of classification among the lowly forms, he says, "I have made the attempt to throw some light upon this systematic chaos, by placing, as a special division between true animals and true plants, all those *doubtful organisms* of the lowest rank which display no decided affinities nearer to one side than to the other, or which possess animal and vegetable characters united and mixed in such a manner that since their discovery an interminable controversy about their position in the animal or vegetable kingdom has continued." It will be seen, then, that the only criterion for this kingdom is that they be "*doubtful organisms*"; and unless there be some marked and palpable feature, it is certain that controversy would be rather increased than diminished.

The division as it first stood was, the Monera, to which I have alluded; the Protoplasta, including Amœbæ, Arcella, Diffugia, Gregarinæ, &c.; the Diatomaceæ, the Flagellata, the Fungi, the Noctiluçæ, the Rhizopoda, including Foraminifera, Polycistina, &c.; and lastly the Sponges.

Now the sponges, although by no means exhaustively understood, have been sufficiently studied to display the manner of their reproduction. The method is two-fold; the relation of the one to the other not being fully known. The first is distinctively sexual, the second is called asexual. In the sexual method, certain sponge particles separate themselves, become invested with a nucleus and nucleolus, and resemble ova. At the same time other small sarcodes become still, their contents become molecular, and finally change into spermatozoa. These rupture, the two elements meet, and embryos are produced, which are first ciliated and free swimming, and then fixed as new individuals.

Now, with the sponges in his new kingdom, Haeckel could offer no distinctive feature by which to distinguish its members. The division was simply arbitrary. This would be fatal to it. The sponges were the real difficulty; if he

could get rid of these, his "kingdom" would be defined. At this time, after carefully reviewing this order, he thought they could be safely and wisely removed. He held, indeed, that they should be placed among the Cœlenterata; and contended that they were compound *polypi*, closely related to corals; this inference being made, not from the study of the animal in its minute structure, but from a comparison of its general architecture; the main point of its affinity being the oscula and pores, as comparable with similar canals in the corals.

Having thus, then, freed himself of the sponges, he held that his Protista kingdom had one striking and unalterable feature: all that composed it were *asexual*. Sex was unknown within its pale.

Since that time, however, two remarkably laborious and competent students have worked out exhaustively the minute history of the sponge. H. J. Carter, Esq., in England, and Prof. H. James-Clark, of Kentucky, have independently confirmed each other, in proving that a sponge consists of an enormous aggregation of *separate* animals; that they are aggregated upon a silicious or coreaceous framework or skeleton, and that in reality it is simply a vast accumulation of "*Flagellate Infusoria*."

The result of this is, that the sponges must be relegated once more to the Protista. And, granting for the moment that all the other proposed members of the kingdom *are* asexual, this must introduce sexuality into it, and so leave it positively without bounds. For if the limits be simply arbitrary, then what Haeckel calls Protista, another zoologist might call animal, and another vegetable; and the proposed new kingdom would but add another factor for confusion, rendering division more difficult than it is at present, with the ancient separation into merely animal and vegetable.

But granting that what Haeckel claims were true; grant-

ing, in his own words, that the "important character" of his Protista kingdom is, "the total absence of sexual reproduction;" it still appears to me unwise and unwarranted to establish such a division.

I do not hesitate to say that the teeming myriads of animal and vegetable forms revealed by the microscope are quite as large, and present quite as many generic and specific differences, as that realm of animated nature which is visible to man's unaided eye. The naturalist needs not to be reminded of the enormous errors which have grown up with his science, as the result of improvised generalisation and unguarded inference. Modern zoology is mainly concerned in correcting the erroneous classification of the past. But if such vast errors can have arisen, extended over such an enormous area of time, and in a region where man's hands can handle and his eyes can see, how careful should we be in fixing and defining, in a realm of which we know relatively nothing, and where we have to use the highest practical culture, combined with the latest achievements of modern art. The life, history, and development of only the *smallest proportion* of microscopic animals is known, and that but imperfectly. How, then, without a knowledge of their embryology, their metamorphoses, their habits, their modes of reproduction, and a hundred other things, can we presume to declare them members of this kingdom or of that, or assert their right to belong to a new one? How short a time ago were we utterly ignorant of the mode of fecundation in *Ferns*; and how the discovery of that beautiful process has explained similar difficulty in the Mosses, the Liverworts, the Horsetails, the Lycopodiums, and even thrown a wonderfully instructive light on the Conifers themselves. Who shall say, then, that because we cannot *now* discover the sexual fecundation of the fungi, such fecundation does not exist? We do not call a plant asexual,

because in the same flower it contains the anther and the pistil—the male and female elements. The hop is not more sexual than the ranunculus. The common hydra has two modes of increase; a simple budding process on the one hand, and the definite production of *ova* and *spermatozoa* on the other. If our opportunities of observation had extended only to the *budding* process, we should declare it *asexual*. Look for a moment at the mode of increase displayed by the *Corynida*, a hydrozoic group of the *Cœlenterata*. They are extremely small, and the reproductive elements are in the form of external processes of the body-wall; they are called gonophores. These assume a bell-like form, from which depends a “manubrium,” which the clapper of a bell will well represent. In its early state it is attached to the parent organism, but is soon freed, the clapper-like portion of the bell having changed into a *mouth*. It is now a free swimming animal, a jelly fish—one of the so-called medusæ—and, eating voraciously, it attains a gigantic size, ranging from pounds to hundredweights.

Now until comparatively recent times these gonophores were a large and important class of hydrozoa; they are now strikingly reduced, and there is a high probability that they will be shortly entirely done away. And why? Because it has been found that these so-called medusæ are not distinctive animals at all; they are merely, so to speak, the anthers and pistils of the parent corynida! The ova and spermatozoa develop in the sac of the manubrium, the organism splits up, and embryos are set free; these embryos resembling and becoming, not the jelly-fish that gave them birth, but the fixed corynida from which the jelly-fish arose.

Now let a process approximately as complicated and strange as this arise among the teeming hosts that require a magnifying power of three hundred diameters properly to display them, and, without a knowledge immensely larger



than that which we possess, would it be wise to settle their domain ?

It is well known that many larvæ of animals have been, and doubtless still are, taken for distinct species, or even genera. Thus the larval crab was described as distinct, under the name of *zoea* ; and at this hour there are some who question whether the *axolotl* is larval or complete. Then by what possible process of reasoning can we venture upon a wholesale generalisation of the microzoa, of whose life-history we know so vastly little ?

Again, if we study the known or discoverable facts, they are still further opposed. For example, absolute coition is not necessary in order to the fecundation of all animal ova. In the Asteroidea, an order of the Echinodermata, the spermatozoa may be emitted by efferent ducts into the surrounding medium, and reach the ova by comparative chance. Now I have been studying with considerable assiduity lately the lowliest protoplasmic forms—Haeckel's Monera. I had a large number so placed that they might be observed with high powers, and still be fed and live. For some time they continued simply to divide ; and occasionally two would wholly blend together and become one. But at length all fission ceased, and I supposed the monads must be dying. But observing one with great care along its edge, magnified seven hundred diameters, I observed what looked like a current, such as would be caused by the mingling of spirit with water. I immediately changed the power to fourteen hundred diameters, and saw what I am convinced was an emission of *something* from the monad (Fig. 1 A). This continued for quite half an hour. By the next morning, five out of seventeen monads in the cell became opalescent, grew darker, then granular, and in seventy-two hours developed into large numbers of what Metcalf Johnson knows as "pin-point monads." Now I will not assert





absolutely that this was a sexual act; it might have been a coincidence; but I think it admonishes caution as to hasty generalisation. But I have pushed my enquiries further. "Alternation of generations" and Parthenogenesis are now established facts, in even high orders of animals. Among the insects, we have the Aphides. In them, as is well known, the winged parent of the autumn lays eggs producing the winged and sexual brood of the spring. The eggs of these produce wingless, sexless aphides, for from seven to ten generations; the last of these being again winged and sexual. Among the Entomastraca, the Cyprides, which are enormously prolific, a single impregnation serves for the entire lifetime, which may range from three to five years. The same applies to the Copepoda, most markedly to Cyclops. While in Cladocera, of which *Daphnia Pulix* is a representative, the influence of a single fecundation is transmitted through several generations; the young females bringing forth a brood immediately after they are hatched, and before congress was possible. Hence the males are very few and feeble, being rarely seen. With these facts as finger-posts, I made special observations upon *Amœba* and *Actinophrys* Sol. I took three fine specimens of *Amœba*, and kept them in the same cell, but separated. They were well fed. Two of them proceeded at once to multiply, but constantly and persistently in different ways. One by the detachment of a pseudopodium (Fig. 2 *b*), the other by actual, though not always equal, division (Fig. 3). I made it a point at once to remove the detached individuals. This fission-partition went on in the case of one *Amœba* to a sixth division, in the case of the other to the seventh. Here it stopped, and they merely increased in size. The third *Amœba* underwent no further change than a gradual but distinct increase in the size of its nucleus, and an apparent granulation of its centre. Fig. 4 *a* gives the appearance of



this *Amœba* on the first day, Fig. 4 *b* gives it on the fourth day. I now fed the two others with carmine, in order that I might distinguish them if brought into contact with the other. When this was well done, I placed one in the neighbourhood of the one whose nucleus had increased. For a whole day no change ensued, both were sluggish; when at length, with three hundred diameters, I saw the same class of oily current issuing from the edge of the one with the enlarged nucleus as I had seen before in the *Mbnad* (Fig. 5). Now, however, I could use no higher power without endangering the whole investigation. So I waited and watched; and in two days little masses of oily-looking matter collected round the nucleus of the other one. At first they looked like vacuoles, as seen in Fig. 6; but gradually they emerged, the *Amœba* apparently assisting in the emergence by protruding the larger part of its sarcode to that part of itself opposite to where the globules were emerging, as seen in Fig. 7. Thirteen such bodies were protruded, and they each became separate *Amœbæ*. Now I feel positively assured this was a sexual act; and it points to the fact that, whilst the *Amœba* may reproduce itself by fission, or as far as we can now see asexually, sexuality is equally its characteristic; and therefore it has no more right to be considered sexless than the *Aphis* or *Daphnia*. I may remark, that I placed the other segmented *Amœba* in the same position as the one that became pregnant, but without result. This, however, I could easily explain. My experiments with *Actinophrys*, although not complete, have been equally striking, and lead directly to the same conclusion. I would urge, then, that our duty is not to establish, upon a foundation of sand, a new kingdom, but really to make ourselves acquainted with the old; lay facts under tribute, and then generalise.

But the want of sound philosophy displayed in this proposal is further seen in the fact, that, even if all its claims





were just, and its conditions at least apparently fair,—granting that the sponges could be removed from the proposed new kingdom, which is now impossible, and that it could be shown negatively at least that the members of the proposed kingdom *were* without sex,—it could yet be shown that *this* is not a criterion which it could alone possess. Thus, amongst the Scolicida, and even the true worms, there are abundant instances of true asexual reproduction. It occurs constantly amongst Planarians and Rotifers. The process of non-sexual reproduction in the Naïs is another striking example. Even in Errantia gemmation may take place; and the Barnacles and Balanidæ are purely hermaphrodite, with one or two marvellous exceptions. So that, in this sense, worms, and even crustaceans, must belong to the Protista.

The fact is, the life-history of these beings must be studied and fully known, their embriological and morphological relations seen, and their habits fully understood, before we can venture to assign their place in nature.

There can be little doubt that the sarcode of the Foraminifera presents as lowly a form of protoplasmic life as may be found. And I believe it should stand at the bottom of the animal series. It has neither endosarc nor ectosarc; it is without nucleus or contractile vesicle—a mere mass of living jelly. It is, indeed, what Haeckel has called the Monera, whose sarcode excretes a test. But if we come to the Amœba, we have endosarc, ectosarc, a nucleus and contractile vesicle. In Gregarina, we have still further differentiation. It has endo- and ectosarc, nucleus and nucleolus; Van Benedem demonstrates under its cuticle a *muscular layer*, and it often has an external process. Conjugation frequently happens; two individuals blend and encyst, and eventually break up into small Gregarinæ. I do not say that reproduction does not occur without this coition; but I do say that this coition never occurs without reproduction.



I would therefore urge that the apparently unsexual ones are comparable to the second or third generation of unimpregnated Daphniæ in producing their progeny. The male element is conserved and transmitted. At least, I submit that the whole evidence tells against the establishment of a new Kingdom.

There is no virtue in the hoary three. In the glorious future that is before her, Science may discover ten; or she may reduce them all to one. Let her do as Nature bids her, and she will do truthfully and well. But we must ever interpret as the facts around us warrant; and I apprehend that the facts as they now stand discountenance the recognition of a Fourth Kingdom in Nature.

#### DESCRIPTION OF PLATES.

Fig. 1.—A group of Monads; the one marked A emitting a viscid matter all round, which preceded multiplication in some of the surrounding Monads.

Fig. 2.—An Amœba (a) multiplying by the fission of a pseudopodia (b).

Fig. 3.—Another Amœba multiplying by nearly equal division.

\*. The one marked 2 continued to multiply *only* by the separation of pseudopodia; while that marked 3 multiplied persistently by more or less equal division of the entire sarcodæ.

Fig. 4.—Represents the Amœba in which no fission took place. a shows the nucleus at the beginning, and b the same, at the end of four days.

In b the granulation and enlargement of the nucleus is seen.

Fig. 5.—Shows the emission of the same viscid matter as in the Monad, partly from the nucleus and partly from the sarcodæ.

Fig. 6.—One of the surrounding Amœbæ after the emissions from the one referred to in Fig. 5; granules have collected round the nucleus.

Fig. 7.—These granules in process of emission. They passed out from a very thin film of the sarcodæ, one or more at a time.

## ON THE MICROSCOPIC CHARACTERS OF COTTON.

BY THE REV. H. H. HIGGINS, M.A.

WITH PHOTO-MICROGRAPHIC ILLUSTRATIONS, BY THOMAS HIGGIN, Esq.

CERTAIN characters of the fibres of cotton, not otherwise conspicuous, are readily discerned by the aid of the microscope. The question proposed for determination is whether these characters, in a strictly commercial point of view, are of sufficient importance to be taken into consideration in business transactions.

It is not for a moment anticipated that the ordinary tests can ever be superseded by any method of microscopic inspection. Freedom from the larger kinds of impurities, colour, but above all length of staple, are qualities which must always chiefly affect the value of a sample, and on these points the microscope has little to reveal. On the other hand it seems probable that in detecting degrees of fineness, evenness, coarseness, crookedness, weakness, lustre, fitness for spinning, and, probably, of capacity for receiving and retaining dye, some advantage may be gained by the use of a high magnifying power.

It may be asked, Are not the present methods of judging cotton sufficient for all practical purposes ?

No elaborate argument seems to be required to prove that the better the qualities of cotton are known, the more thoroughly and exhaustively the characters on which its excellences and defects depend are ascertained, the better in the long run it will be for the cultivator, the buyer, and the manufacturer.

accompanying plates. This method involves a happy combination of photographic and optical appliances, in which I believe my friend Mr. T. Higgin, of Huyton, is not surpassed by other scientific workers, here or elsewhere.

What are the advantages likely to be derived from the use of the microscope ?

(1.) It may probably be found useful chiefly in deciding questions of some difficulty: for example, in comparing various kinds of Surat, or North American Cottons. Where two samples are apparently equal in value and suitability, the microscope may give a decided preference to one of them; and a decision thus formed would probably be justified by the manufacturer. It is not altogether improbable that the microscope may lead to a more correct appreciation of some kinds of cotton which may hitherto have been under-rated or over-rated.

(2.) The microscope may greatly facilitate and generalise the power of judging cotton. That by the methods ordinarily in use a sample of cotton may be estimated within a sixteenth of a penny per pound of its value, appears nothing less than wondrous; it is at all events a striking illustration of the results of long continued observation combined with great experience and possibly natural aptitude. But it seems to imply work done at a needless disadvantage. A cotton spinner, before the days of Crompton and Arkwright, could by long practice and extreme delicacy of hand spin a beautifully fine yarn; but improved machinery gives the spinner an advantage which has now become essential.

Will not the use of the microscope require a training as long and as special as the ordinary hand-test of cotton ?

The cases are not parallel. In the ordinary method of judging cotton, the natural powers of sight and touch have to be cultivated till they become sensitive to minute points of difference otherwise quite indistinguishable. By the

The question of the use of the microscope in estimating the value of cotton is not in the least new ; but it is renewed under altered circumstances. Men of business are more inclined, and better able, to avail themselves of the aids of science now than formerly ; whilst recent improvements have rendered microscopes much more efficient, much easier to use, and at the same time much less expensive, than they were fifteen or even ten years ago.

The following circumstance, mentioned by Edward Baines, Jun., in his *History of the Cotton Manufacture in Great Britain*, may illustrate the progress of microscopical science. Two thousand years before the birth of Christ the arts of spinning and weaving flourished in Egypt, the material used being flax. Rouelle, in the *Memoirs of the French Academy of Sciences* in 1750, and Dr. Hadley, in the *Philosophical Transactions* in 1764, had contended that the mummy cloth of Egypt was cotton ; and so it was esteemed to be till, in 1836, James Thomson, F.R.S., having obtained from Belzoni various specimens of mummy cloth, determined to renew the investigation. All other methods failing to afford a satisfactory solution of the difficulty, he bethought himself of the microscope. He was not however possessed of such an instrument, nor was he accustomed to its use. Mr. Thomson therefore applied to his friend Mr. Children, who undertook to secure the good offices of Sir Everard Home in prevailing on Mr. Bauer, a microscopist, to make the requisite examination. Thus a Fellow of the Royal Society, less than forty years ago, found himself three removes from an authority competent to resolve a question capable of being decided in a few moments by the aid of a very ordinary microscope.

The novelty which I cannot claim for my own share in the present effort, I may confidently attribute to the beautiful method by which the fibres of cotton are represented in the

microscope, minute differences, even such as might escape detection by the most practised eye and hand, are rendered obvious at a glance. Alike in both methods knowledge is required to determine how an observed quality or character is likely to affect the market value of a sample; but by the microscope the field of observation may, I think, be greatly extended.

Nor should I anticipate that personal disqualifications are likely to interfere with the use of the microscope. In large scientific gatherings, hundreds, quite unaccustomed to use a microscope, readily discern delicate markings on an object shewn by a magnifying power higher than any needed in the examination of cotton.

Is the use of the microscope compatible with the necessary rapidity of commercial transactions?

It is chiefly in cases of doubt or difficulty that a reference to the microscope may be advantageous; and although cases of this kind may be vastly outnumbered by ordinary sales requiring no such aid; yet if in one out of five hundred transactions an advantage however small can be obtained by the use of the microscope, then, considering the immense proportions of the cotton business, the results in the aggregate may prove to be by no means unimportant.

Many economic plans acknowledged to be desirable are postponed on account of the inconvenience inseparable from their adoption; for example, the decimal system of weights, measures, and coinage. The introduction of the microscope cannot possibly occasion any inconvenient interference with established methods. Suppose that only two or three practical men are induced to give the method a fair trial. At leisure moments they examine a few samples, carefully recording the results of their observations. No long time will elapse before the fluctuations of the market will invalidate or confirm one or more of the inferences drawn from their

investigations; and if the method be of any real value, a certain amount of confidence in it will not be long in growing up. Meanwhile there may be no interruption but rather a furtherance of ordinary business; for it is probable that discriminations depending only upon the common hand-test may be improved when all the visible characters of the cotton fibre shall be made familiar to the eye by the use of the microscope.

The course suggested in the foregoing remarks seems to be a very natural one, and its extension to other branches of business is probably only a question of time. Flour is said to be tested by the very primitive method of baking a small loaf from each sample. In this important article of trade the microscope may possibly supersede other tests, as it has already done in starch. The iron trade might not seem a very promising field for so delicate a test, yet in estimating the value of iron by the examination of the surface of a fracture, the microscope is now extensively used, and has indeed become indispensable.

The cost of a microscope suitable for the examination of cotton may range from six to twelve pounds.

Botanists recognise four distinct species of cotton:—*Gossypium herbaceum*, the ordinary Indian cotton-plant; *Gossypium arboreum*, the Indian tree-cotton; *Gossypium Barbadense*, to which the North American cottons belong; and *Gossypium Peruvianum*, Pernambuco or Brazil cotton. (A. Henfrey, 1857.) Cotton has however shared the fate of most plants that have been long in cultivation, and has become remarkably plastic. Superior culture yields numerous varieties of great beauty and excellence, which however are deficient in stability, and are very liable to degeneration when unskilfully treated.

The fibre of cotton is a true vegetable hair developed

from the epidermal cells of the cotton seed. Its appearance under the microscope is very peculiar and altogether unlike that of any other vegetable hair or fibre. Through what stages of development it has reached its present highly specialised form is a question of great interest to the botanist, but need not here be discussed further than is necessary to explain the distinctive characters observable in the fibres of cotton.

Recently, through the kindness of Mr. T. Higgin, of Huyton, I received a sample of wild cotton from Africa, which I believe to be a genuine cotton, Plate V., No. 10; but even if the plant from which it was gathered should belong to a genus distinct from *Gossypium*, the African sample may not the less serve to illustrate the derivation of a very special fibre from one of an ordinary character.

The fibres of the wild cotton, as compared with those of good samples, are large and very weak tubes. They are crooked or much curved and exhibit traces of joints at irregular intervals. Some of them exceed .002 of an inch in diameter, and nearly all of them show a deposition of secondary matter in the form of spiral filaments or fibrillæ lining the interior of the tube. It is almost needless to remark that this is a common form of vegetable growth. The tube is the cell wall, which is pure cellulose and structureless. During growth, and whilst its contents are living, layers of secondary matter are deposited, lining the interior of the cell. This lining in various plants takes distinct forms known respectively as annular, reticulated, pitted, or scalariform tissue; but none of these is more common than the spiral form seen in the wild cotton. Thus far therefore the wild cotton exhibits an ordinary form of vegetable growth; but it is manifestly quite useless for spinning purposes, and unlike in structure the cotton of commerce.

In some of the fibres of the wild cotton, the fibrillæ

show a tendency to a longitudinal rather than a spiral growth within the tube, which in such instances becomes more or less flattened or compressed, thus assuming one of the distinctive characters of the fibres of cultivated cotton. In most of the wild fibres there are numerous fibrillæ having a spiral direction from left to right. In the flattened fibres, in which the fibrillæ are disposed more or less longitudinally, their spiral tendency seems to be converted into a spiral twist of the fibre itself, having also a direction from left to right. A similar but more perfect form of spiral twist is one of the most prominent microscopic characters of the cultivated fibre.

A rare and peculiar fibre, of which solitary examples may occasionally be found in Brazilian, Peruvian, and African cotton, almost exactly resembles the tubular fibre of the wild cotton of Africa.

*On the importance of Spiral Twist in the Cotton Fibre.*

The strength of any thread or yarn depends on two distinct properties. First, the strength of the individual fibres of which it is made up; for it is evident that the strength of the yarn cannot be greater than the aggregate strength of the single fibres composing it. But when the yarn is much longer than the fibres, they may be pulled asunder without breaking. In this case therefore the strength of the yarn depends on some property by which the fibres are kept from slipping. Where the fibres are moderately hard, and no adhesive substance is used to bind them together, this property, I suppose, resolves itself into the friction set up between the surfaces of the fibres in contact. It follows that the strength of the thread cannot be greater than the friction between the fibres of which it is composed.

If the aggregate strength of the fibres is greater than



the friction between them, the excess of strength is superfluous; the fibres will slip asunder without breaking. If the friction be greater than the strength, the excess is superfluous; the fibres will not slip asunder, but the thread will break.

In flax and hemp, and in most of the true vegetable fibres, but especially in silk, the length of the single fibre is very much greater, in proportion to its diameter, than is the case in cotton. In these materials, therefore, the frictional element is of less importance; that is to say, it is less necessary for short lengths of fibre surfaces to act strongly on each other. If a flax fibre is six times the length of a cotton fibre, *ceteris paribus*, it has six times the power of holding on to its neighbour fibres by friction. Silk is very smooth, but its fibres are exceedingly long as compared with cotton. Wool is generally much longer than cotton, but in wool the property which prevents the fibres of a yarn from being pulled asunder without breaking is not exactly friction. It is well known that the surface of a woollen hair is covered by scales or other appendages, which become more or less felted, and interlock one with another in such a manner that one hair cannot slide upon another without positive disruption of the appendages. The retaining force in this case is not simple friction, but is rather strength of material.

The fibres of cotton have no such appendages; they are nearly smooth; in fact the fibres in some samples have polished surfaces, or, as it is called, a silky lustre. Add to this that, as compared with other textile materials, the fibres of cotton are very short, and it will seem surprising that they should hold together. Stretch a piece of cotton yarn six inches in length—six distinct sets of fibres support the tension. What prevents their ends from pulling out? Nothing, as I believe, but friction; the efficiency of which

is provided for by one of the most beautiful little mechanical arrangements observable in nature.

The cotton fibre is frequently somewhat strap-shaped, having a spiral twist resembling that of a stick of barley-sugar. Many fibres may be more nearly represented by two pieces of cord, laid evenly side by side, and firmly stitched together, so as to form a flattish double cord which, when more or less twisted, will form a fairly correct model of the fibre (*group C*). It will readily be seen that when, by various processes familiar to the spinner, the fibres of cotton are laid side by side, and drawn more and more closely together, the side of one fibre will dispose itself in the groove formed by the spiral twist of a contiguous fibre; and when a rove of many such fibres is twisted, the contact will become exceedingly close, each fibre lying partially, for its whole length, in the spiral grooves formed by two or more contiguous fibres. So close indeed do they lie that when strong sewing cotton (*No. 18, J. & R. Coats*) is cut, the ends of more than three hundred fibres are displayed.

An illustration will render the advantage of this flattened form more obvious. In a piece of rope, made up of three strands, let one of the strands be disengaged from the other two; let this single strand be unwound, leaving the other two strands side by side, retaining the spiral twist of the rope, and of course showing a kind of spiral groove, from which the third strand has been removed. With the exception of being more sharply twisted, the two strands of the rope, the third being removed, in shape resemble the twin-formed fibre of cotton with its spiral twist. When cotton fibres, as in the process of spinning, range themselves mutually in the spiral grooves of contiguous fibres, the effect of the twist is, that the greater the strain on the yarn the closer is the mutual grip of the fibres, which may break but will not slip asunder. Cotton fibres vary very much in the

character of their twist, which is always present in the best fibres, though some inferior staples exhibit scarcely any. Cotton wool seems, in fact, to be made up of naturally formed strands, in which nature has in a great measure anticipated the work of the spinner. I am not acquainted with any other vegetable hair showing a similar twist, nor can I discover a trace of any property likely to be beneficial to the cotton-plant itself in this remarkable structure.

For the most complete model I have yet seen of the cotton-fibre I am indebted to Mr. T. Higgin, whose previous views were confirmed by the following simple yet very satisfactory experiment. Let a tube of vulcanised India-rubber, eight inches in length, and the size of a cedar pencil, be twisted to the extent of about five or six turns. If the tube is evenly made, it will become uniformly from end to end compressed or flattened as it takes the spiral form, but the strength and elasticity of the material will not allow the tube wholly to collapse: the medial line will be flat, but the edges will appear to be thickened, being, in fact, slightly hollow. In this form the India-rubber tube resembles cotton fibres, belonging to a group (B) hereafter to be described. Let the tube, the twist remaining as before, be stretched to double its former length; it now takes the form of fibres of another group (C). Indeed by a little management the tube may be made to assume a variety of forms perfectly familiar to the eye practised in the examination of cotton by the microscope.

My great admiration of this experiment must not, however, lead me to represent cotton fibres as being always uniformly thickened tubes. Many fibres, some of them almost without twist, exhibit grooves and other appearances indicating an unequal deposit of matter within the tube of the fibre.

Photograph No. 12, representing the broken end of a

fibre (C), indicates a fact of which I had seen no notice till it was pointed out to me by Mr. T. Higgin, who remarks, "The examination of broken fibres shows that the fibres are tubular, and that the wall of the tube is a substance, on the inside of which is deposited a great number of fibrillæ or spiral filaments, running along the fibre in wavy lines, such as would be the appearance of spiral threads drawn out until they had almost lost the spiral form."

*The various kinds of fibres, commonly found in the Cotton of commerce, may conveniently be assigned to groups distinguished by the following microscopic characters.*

(A) Very flat, flimsy, blade-like fibres, usually rather broad, often crumpled or angled, but never showing an even spiral twist.

(B) Flattened fibres, not flimsy, yet by no means stout. The edges *appear* as if thickened by a narrow hem. Frequently twisted spirally.

(C) Fibres somewhat flattened; the rounded edges nearly meeting. Medial line smooth. Generally showing a beautifully even twist.

(D) Fibres somewhat flattened; the roughish rounded edges nearly meeting. Medial line coarse. Twist deficient.

(E) Cylindrical fibres, generally uneven, and obviously incapable of showing a proper spiral twist.

(F) Hair-like fibres.

(G) Weak tubes, exhibiting many spiral fibrillæ.

*Remarks on the foregoing Groups.*

(A) These fibres consist of an extremely thin double wall of cellulose, the tube being entirely collapsed, sometimes including a few short filaments. They have been termed "least ripe cotton," or "dead cotton," and are incapable of being dyed. (A) fibres abound chiefly in some

kinds of cotton from the East, but few samples are entirely free from them. Diameter, from .001 to .002 of an inch. Utter trash.

(B) In these fibres the cellulose wall is lined by a thin deposit of secondary matter. It has been suggested by Mr. T. Higgin, that the thickened appearance of the margins may be due to the transparency of the fibre, since a flattened glass tube, when held up to the light, presents a similar appearance.

The group includes three varieties.

Var. 1. Fibres broad, strong, coarse, and always short. Twist deficient or very irregular. In Indian and other cotton, but never abundant.

Var. 2. Fibres of moderate length. Twist very sharp (over twisted), sometimes carrying the whole fibre round spirally (corkscrew twist). Chiefly in South American cotton.

Var. 3. Extremely fine and narrow fibres, always very slowly or obliquely twisted, and always forming a long staple. Prevalent in all the silky cottons.

Fibres of this group have been termed "half ripe cotton;" but from the great perfection of their form I am inclined to think that many of them, especially those belonging to Var. 3, cannot justly be described as immature.

As constituents of cotton, good average (B) are next in value to the fibres of the following group.

(C) Fibres with thickened walls. Minutely tubular. These fibres, more than those of any other group, characterise good samples; they occur only sparingly in inferior cottons, whilst in the most useful cottons they form the chief portion of the staple. In "Sea Islands," though not nearly so numerous as the fine (B), extremely slender (C) are not rare; and these, under the microscope, are most

beautiful of all cotton fibres. The shades indicating the twist are fine and smooth; and the twist itself, very rarely absent in true (C), is even and moderate, the length of a revolution being equal to from five to eight times the diameter of the fibre. Coarse (C) are not abundant in any sample.

(D) These fibres are often coarse and very crooked, never exhibit an even twist, are prevalent in most bad samples, and are almost absent in the best; yet they appear to be strong, and are found in considerable numbers in all but the finest samples.

(E) Never straight; often uneven and crooked. They are cylindrical, but not, I think, tubular. Found in all cottons; the fewer of them the better for the sample.

(F) The ends of good fibres are sometimes hair-like, but there are proper (F) fibres in most samples; they are often even and moderately straight, but must, I should think, be regarded as trash.

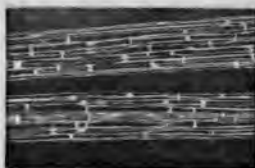
A sample was sent to me which was said to be the produce of *Gossypium arboreum*, Indian tree-cotton, of which



at the time I made the following notes. The seeds green, the cotton very white, length of staple three-quarters of an inch. Fully formed fibres (B) and (C), with some (E); apparently very strong and straight, and by no means coarse. Does not at all resemble the Surat cottons, but is much

more like the best North American samples. Mr. T. Higgin, who received the sample from Major Trevor Clarke of Daventry, informs me that the use of this apparently very valuable cotton is restricted to the manufacture of the sacred thread worn only by the Brahmins.

The accompanying wood-cut represents the produce of *Eriophorum polystachyum*: the common cotton-sedge which



abounds in the turbaries around Liverpool. It is magnified sixty diameters. Expensive machinery is said to have been constructed for the purpose of spinning this material, which a very slight examination with a microscope shows to be utterly unfit for making yarn.

The accompanying twelve photographs have kindly been executed for the present Paper by Mr. T. Higgin, of Huyton, whose wishes I feel bound to consult by allowing their merits to speak for themselves.

The details of structure in all of them may be observed to advantage by the use of a lens.

The first ten are on a scale of about sixty diameters; the whole area of the photograph, therefore, in each instance represents so much of a flake of cotton as might be covered by the head of an ordinary pin. In No. 11 the fibres are much more highly magnified, and are shown on a scale of two hundred diameters. This scale, which is readily obtained by a quarter-inch object-glass, used with a low eye-piece, may be reckoned as a convenient one in the examination of cotton. A much lower magnifying power is not sufficient.

The process of preparing cotton for examination is

extremely simple. Select from a sample a flake of cotton the size of a small camel-hair pencil; tease it out till you can see distinctly through it and then place it, *dry*, between two slips of glass the size of an ordinary microscopic slide. It can then be examined from end to end. Three or four such trials should be made from different parts of the sample.

Photo. No. 1. This was executed from a sample of Sea Islands cotton, of extraordinary fineness, for the sake of showing the most slender fibres found in the cotton of commerce. A small quantity only was imported from Palmetto Island, about five years ago, when it was sold at 108d. per pound. Muslin manufactured from it in Manchester gained the first prize in the French International Exhibition in 1868. The fibres, with the exception of those ending at 1 and 2, which appear to be very slender (C), are silk-like, and scarcely belong to any of the groups previously described. Though so gossamer-like that a breath of air might float them, and hence appearing crooked, their form and "behaviour" indicate considerable strength.

Photo. No. 2. Taken from a sample of unusually stout and strong Fiji cotton. The fibres shown belong to group (B), var. 3. Some of them have more twist than is usual; but the fibre ending at 1 is exquisitely formed, and has so gradual a twist that only one revolution is shown from 1 to 1'.

With the admixture of a few slender (C), Photo. No 2 would exactly represent good Sea Islands cotton; whilst Photo. No. 1 has very much the appearance of many samples from the Fiji Islands, as seen under a somewhat lower magnifying power.

Photo. No. 3. Thirteen fibres are here shown, chiefly good (C); but the seventh from the bottom is an (A) fibre, and is useless. The value of the sample increases as the fibres correspond more closely with the example of (C),



marked 1, 1'. This illustration is thoroughly characteristic of the cotton it represents.

Photo. No. 4. Chiefly very fair (B) with some (C). Notwithstanding the dissimilarity between this and the preceding illustration, the fibres are evidently of the same well-defined structure. The best Egyptian samples resemble this, but the fibres are more slender.

Photos. No. 5 and 6. Photographic illustrations, however excellent, cannot, of course, exhibit all that can be observed by the eye, aided by the microscope, especially since the flake of cotton under examination can be scrutinised from end to end, and compared with other flakes from the same sample. Still it seems possible to detect in these illustrations, when compared with those of North American or Egyptian cottons, a difference which is not one of superiority or inferiority, but which is probably specific. The South American samples are more opaque, and therefore, *ceteris paribus*, show whiter in the photograph. Both these illustrations exhibit fibres with a rapid twist, which is very characteristic of the South American samples, and may have something to do with the woolly feel of certain Peruvian growths.

Photo. No. 7. Nearly all the fibres belong to group (D). The difference here is sufficiently conspicuous; the twist is irregular or altogether absent; and in place of the well-defined shadings of the Orleans cotton, there is the coarse, mottled look, common in all Eastern samples, but never assumed by long stapled cottons. The sample, however, is by no means a bad one of its kind. The fibres are uniformly strong, and are free from trash.

Photo. No. 8 has the appearance of being the produce of good seed, spoiled by inferior cultivation and careless picking. A few of the fibres are first rate, especially the one marked 1, 1'. The fibres represented by two fine lines, with

a dark intermediate space, are worthless blades, (A). Many others are extremely crooked. All the looping and intertwining here exhibited, takes place within an area not larger than the head of a pin. It is almost indistinguishable by the eye unassisted, but if cotton from a bad sample be brushed out till it seems ever so even, under the microscope its deficiency in straightness will be very obvious.

Photo. No. 9. A knot of worthless fibres, (A) and (E) or (F); occasioned, probably, by a tendency to twist in fibres too weak to preserve their longitudinal position during the process of ginning.

Photo. No. 10 has been already described.

Photo. No. 11. The fibre 1, 1', which is a (G) fibre, is highly interesting on account of its great resemblance to the fibres shown in Photo. No. 10. The apparent crossing of the spiral fibrillæ is an effect due to the transparency of the fibre. The same fibre occurs, though very rarely, in cotton from Brazil. It may possibly be an instance of reversion, as some branch of an apple-tree might bear a crab, or a pigeon of a highly cultivated fancy breed might show a feather resembling the plumage of the original Blue Rock.

I am constrained to express my admiration of this illustration as a highly successful achievement in photo-micrography.

Photo. No. 12. The end of a (C) fibre, broken under a strain of 110 grains.

## PLATES AND WOOD CUTS.

## PHOTOGRAPHS.

|                |   |           |     |            |
|----------------|---|-----------|-----|------------|
| Plate I.—Fig.  | 1.—Finest Sea Island .....  | magnified | 62½ | diameters. |
| "              | 2.—Finest Fiji .....  | "         | 62½ | "          |
| Plate II.—     | 3.—Middling Orleans .....   | "         | 62½ | "          |
| "              | 4.—Fair Egyptian .....  | "         | 62½ | "          |
| Plate III.—    | 5.—Fair Pernambuco .....  | "         | 62½ | "          |
| "              | 6.—Fair Peruvian (coarse) .....   | "         | 62½ | "          |
| Plate IV.—     | 7.—Fair Dholerah .....  | "         | 62½ | "          |
| "              | 8.—Syrian .....   | "         | 62½ | "          |
| Plate V.—      | 9.—"Neps" .....   | "         | 62½ | "          |
| "              | 10.—Wild Cotton (African) .....   | "         | 62½ | "          |
| Plate VI.—Fig. | 11.—Coarse Peruvian .....   | "         | 200 | "          |
| "              | 12.—Portion of (C) Fibre from Midd-<br>ling Orleans, broken at a<br>strain of 110 grains..... | "         | 800 | "          |

## WOOD CUTS.

|           |                                   |   |     |   |
|-----------|-----------------------------------|---|-----|---|
| Page 15.— | Gossypium arboreum .....          | " | 62½ | " |
| "         | 16.—Eriophorum polystachyum ..... | " | 62½ | " |

PLATE I.



Fig. 1.

**FINEST SEA ISLAND.**

$\times 62\frac{1}{2}$  Diams.



Fig. 2.

**FINEST FIJI.**

$\times 62\frac{1}{2}$  Diams.

117



# PLATE II.

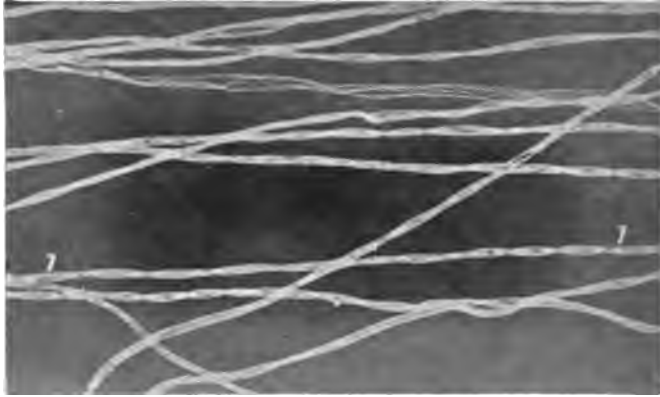


Fig. 3.

MIDDLING ORLEANS.

× 62 $\frac{1}{2}$  Diams.

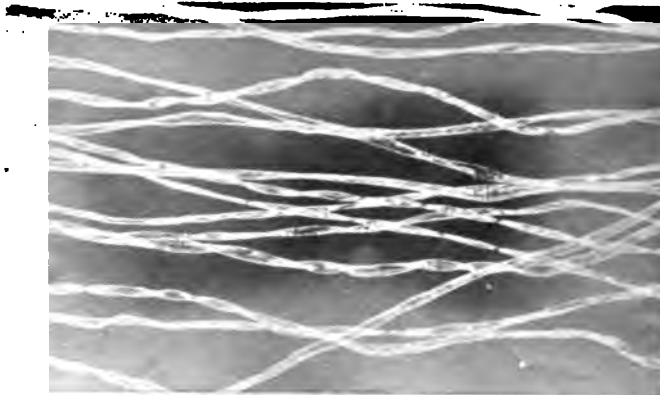


Fig. 4.

FAIR EGYPTIAN.

× 62 $\frac{1}{2}$  Diams.

44



100

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PLATE III.



Fig. 5.

FAIR PERNAMBUCO.

$\times 62\frac{1}{2}$  Diams.

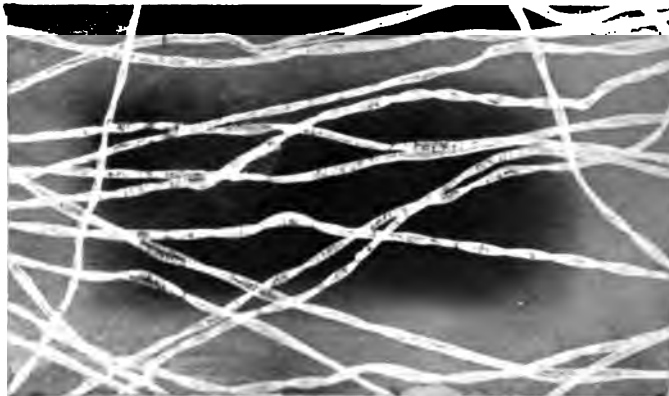


Fig. 6.

FAIR PERUVIAN (COARSE).

$\times 62\frac{1}{2}$  Diams.





PLATE IV.

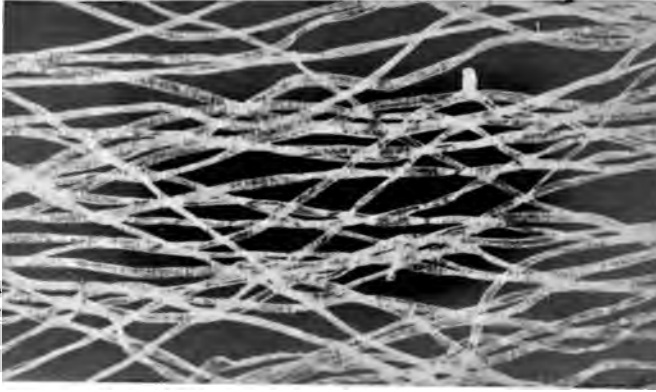


Fig. 7.

FAIR DHOLLERAH.

× 62½ Diams.



Fig. 8.

SYRIAN.

× 62½ Diams.



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PLATE V.

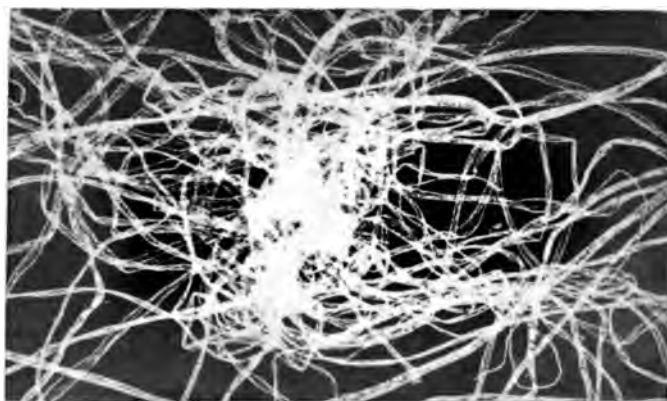


Fig. 9.

"NEPS."

$\times 62\frac{1}{2}$  Diams.

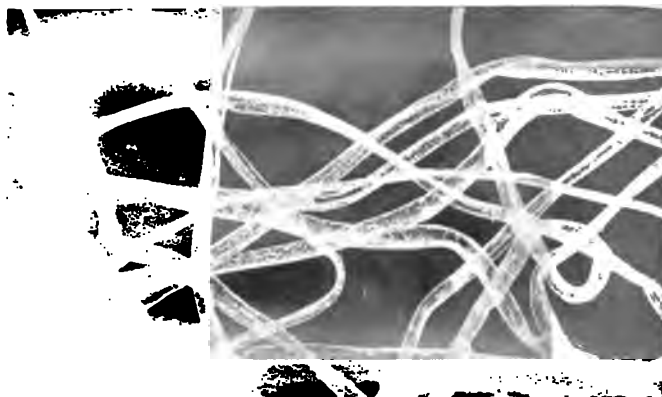


Fig. 10.

WILD COTTON (AFRICAN).

$\times 62\frac{1}{2}$  Diams.



PLATE VI.

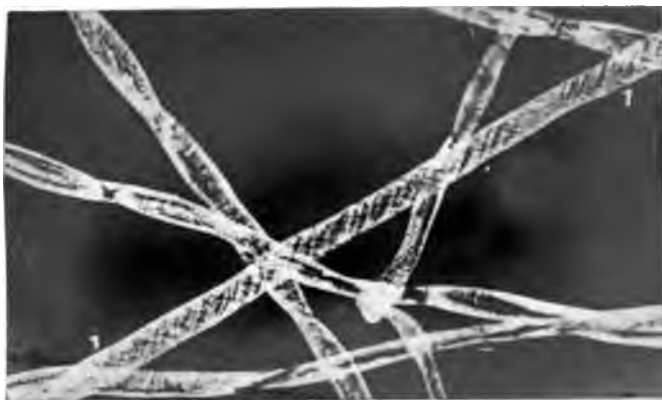


Fig. 11.

COARSE PERUVIAN.

× 200 Diams.



Fig. 12. PORTION OF C FIBRE FROM MIDDLEING-ORLEANS, × 800 Diams.  
BROKEN AT A STRAIN OF 110 GRAINS.





THE ENGLISH VERSIONS OF THE BIBLE,  
IN CONNEXION WITH THE ANCIENT TRANSLATIONS, ESPECIALLY  
WITH THOSE MADE BY THE REFORMERS IN GERMANY.

By REV. C. D. GINSBURG, LL.D., VICE-PRESIDENT.

To understand the rise and the literary merits of our Authorised Version, it is absolutely necessary that we should not only trace the origin and development of the English translations of the Scriptures which preceded King James's Bible of 1611, but also examine the state of the Sacred Volume during the three epochs, as follows, first, the state of the Bible up to the time of the invention of printing in Europe; secondly, its state from the invention of printing to the commencement of the Reformation on the continent; and thirdly, its state from the Reformation to the publication of the Authorised Version in 1611. Without such a review of its condition during these three great epochs, it is impossible to form a correct opinion about the literary merits of our present English Bible, or to decide between the conflicting statements which are repeatedly made both in the standard histories of the world and in ephemeral periodicals, as to whether or not the Sacred Volume was designedly withheld from the people at large before the Reformation.

I must remark at the outset that the design of this essay is not theological nor controversial, but simply to exhibit in its true light, before the Literary and Philosophical Society, a literary chapter of history which has been darkened and misrepresented by ignorance and prejudice. Having thus emphatically disclaimed all polemical intentions, I shall now proceed with my brief description



## PART I.

THE STATE OF THE BIBLE UP TO THE TIME OF THE INVENTION  
OF PRINTING IN EUROPE.

In glancing at this period, and in reviewing the circulation of the Christian Scriptures, i. e., the New Testament, in the vernacular of the people, we must bear in mind the divided state of the Church. As the controversies which raged between the East and the West finally terminated in their reciprocal excommunications in 484, A. D., and in the establishment of the Eastern or Greek Church and the Western or Latin or Roman Church; and as, moreover, these two branches of Christendom adopted two ecclesiastical languages; we shall have to refer to each of them separately.

The Greek Church may be dismissed briefly. She did not require to circulate the Scriptures in a translation, since the original language of the New Testament was almost the vernacular of the people within her precincts, and since the existing Greek translation of the Old Testament (called the Septuagint) was canonised by her and became the authorised version in her pulpits. There was, therefore, no lack of the Bible in the vernacular in the Eastern Church. We shall also see in the sequel that she adopted other means to make the Scriptures accessible and intelligible to her communities.

The Western or Latin Church took equal care to supply her communities with the Bible. The Latin tongue was and still is her ecclesiastical language, and as Hebrew and Greek were but little understood in the west, she at a very early period had the Bible translated into Latin. Hence the *Vetus Latina*, or the old Latin version of the Bible, which existed in the Roman Church from time immemorial,

and which is the basis of the present authorised Latin version called the Vulgate. Now, it has been frequently asserted that though the Roman Church has an authorised version, she kept it back from her members during the middle ages, and that those who ever succeeded in obtaining a Bible were few and far between. It is perfectly true that comparatively few private people had a Bible during the middle ages, but it is equally true that the Church did not withhold the Bible from them.

The solution of this paradox is simply this, that during the middle ages scientific and literary education was possessed by comparatively few ordinary people; and the ability to read and write on the part of the laity was a rare gift. Even amongst those of the highest rank, and in the most eminent stations, we find instances of persons who could neither read nor write. Some charters have come down to us, granted by kings who could not subscribe their names, and who had to make the sign of the cross in confirmation of the grants. Thus a charter of Withred, king of Kent, (A. D. 671–725) which is still extant, is subscribed: “Ego Withredus Rex Cantiae omnia supra scripta confirmavi, atque a me dictata propria manu signum Sanctae Crucis pro ignorantia litterarum expressi.” The charter of Tassilo, Duke of Bavaria, in the eighth century, containing a grant to Atto, Abbot of Saltzburg, is subscribed: “Quod manu propria, ut potui, characteres chirographi inchoando depinxi coram iudicibus atque optimatibus meis. Signum manus meae propriae Tassilonis,” &c. The charter granted by Heribaud, Comte du Palais, and supreme judge of the empire under Louis II., in 878, A. D., is subscribed: “Signum Heribaldi Comitis Sacri Palatii, qui ibi fui et propter ignorantiam litterarum, signum sanctae crucis feci.”

<sup>1</sup> Comp. Mabillon, *De Re Diplom.*, pp. 163, 544, Paris, 1709; Du Cange, *Glossarium*, &c., s. v. CRUX, vol. ii., p. 1191, Benedictine edition.

The authors of the *Nouveau Traité de Diplomatique* also quote Gui Guerra, Count of Tuscany, who had to make the sign of the cross "quia scribere nesciebat," and add, "Il seroit superflu d'accumuler un plus grand nombre de faits, pour vérifier un usage, dont la certitude est démontrée."<sup>2</sup> It is but fair to presume that if the heads of nations avowed their inability to write, this accomplishment must have been a gift rarely possessed by ordinary people. The Bible would therefore have been perfectly useless in the hands of the masses, who, with very few exceptions, could not read; and when the only mode of teaching the Scriptures was necessarily oral.

Moreover, the general circulation of the Scriptures at the time when printing was unknown, and when a manuscript copy was of immense expense, was almost impossible, whatever might have been the disposition of the Church or the State. Some idea of its costliness may be formed from the fact that the canon of the Scriptures contains 85,877 verses, viz., the Old Testament has 23,205 verses, the Apocrypha 4716, and the New Testament 7956 verses. This would make about 1500 pages in manuscript. Taking as a criterion the rate paid by law-stationers to their writers for an ordinary page of plain writing, with a few elaborate capital letters, and the time it occupies to execute such a copy, the cost of the writing alone of a Bible would be at least fifty pounds sterling, according to our present money, and the time required to complete it would be about twelve months. To this must be added the cost of the skins of parchment, which would amount to about twenty pounds more: so that an ordinary MS. of the Scriptures, even without any affectation of calligraphy or expensive illuminations, would cost between seventy and eighty pounds. It is therefore evident that its immense expense would of itself preclude

<sup>2</sup> *Nouveau Traité de Diplomatique*, par deux Bénédictins, tom. ii., p. 426.

the possibility of the Scriptures obtaining a wide circulation among the people at large.

As far, however, as we have any evidence at all, it clearly shows that the Church during the middle ages, so far from withholding the Bible, actually made the greatest and the most wise and successful efforts to teach the import of the sacred narratives to the humblest of her children. This is proved beyond all question by—i. The relics of Art; ii. The Canons of the Church; iii. The incidental mention of numerous MSS., some of which are still extant; iv. The fact that the most distinguished ecclesiastics wrote commentaries on the Bible; and v. By the different translations of the Scriptures into the vernacular of the people. We shall advert to these five points separately.

#### I. THE RELICS OF ART.

No one who has had an opportunity of seeing the beautiful relics of painted windows and pictures in sacred edifices, which depict, in a most touching and impressive manner, the stories of the Bible, will be inclined to question the fact that under the circumstances the teaching by pictures was the best mode of imparting Biblical instruction to the masses, who had neither the means to purchase a MS., nor the ability to read it. We in modern days, after having lustily abused the Church of Rome for following this practice, have adopted it in the picture books from which we now teach our children.

#### II. THE CANONS OF THE CHURCH.

A still more incontestible proof that the Church enjoined the circulation of the Scriptures during this period is to be found in the councils and canons, and in the repeated admonitions to the clergy. Isidore, Archbishop of Seville, (died April 4, 636, A. D.) in his work entitled "Ecclesiastical

Offices," enjoins the clergy to be "continually occupied in teaching, in reading, in psalms and hymns and spiritual songs."<sup>3</sup> At the eighth council of Toledo (A. D. 653), it was enacted "that no one should be admitted to any degree of ecclesiastical dignity unless he knew by heart the whole Psalter, the hymns of the Church, and the office for Baptism."<sup>4</sup> At the council held at Cliffe, or Cloveshore, near Rochester, (A. D. 747) it was decreed by the sixth and seventh canons "that the bishops shall ordain no man, either of clerks or monks, to holy degrees of priesthood, who has not a love for sacred learning."<sup>5</sup> Charlemagne, in the *Capitula data Presbyteris* (A. D. 804), says: "I would admonish you, my brethren and sons, to give attention to these few capitula, which follow:— firstly, that a priest of God should be learned in holy Scripture . . . secondly, that he should have the whole Psalter by heart, &c."<sup>6</sup> Reculfus, Bishop of Soissons, in his "Constitutions" addressed to the clergy (*circa* A. D. 889), insists "that every one of them should endeavour to have by

heart, truly and correctly, the Psalms, the Discourse on the Catholic Faith which begins *Quicumque vult*, &c., and the Canon of the Mass . . . should have a Missal, a Lectionary, a Book of the Gospels, a Martyrology, an Antiphony, a Psalter, and a Book of Forty Homilies of St. Gregory, corrected and pointed by our copies which we use in the holy Mother Church . . . and that if any one is not able to obtain all the books of the Old Testament, at least let him diligently take pains to transcribe for himself correctly the first of the whole sacred history, that is Genesis, by reading which he may come to understand the creation of the world."<sup>7</sup> The Canons of Ælfric (A. D. 950–1000), addressed to Wulfin, Bishop of Sherborn, to be communicated to the clergy, decree

<sup>3</sup> *Bib. Pat.* x. 208.

<sup>4</sup> *Conc.* vi. 406.

<sup>5</sup> *Conc.* vi. 1575.

<sup>6</sup> *Capitularia Regnum Francorum*, ed. Baluz., tom. i. 237, Paris, 1677.

<sup>7</sup> *Conc.* ix. p. 418.

(*Can.* xxi.) "that every priest, before he is ordained, must have the arms belonging to his spiritual work—that is the holy books, namely, the Psalter, the Book of Epistles and the Book of Gospels, the Missal, the Book of Hymns; and that (*Can.* xxiii.) the mass priest, shall on Sunday, and mass-days, explain the Gospels in English to the people."<sup>8</sup>

Peter Abelard, the illustrious mediæval philosopher and divine (1079–1142), in whose "celebrated school were trained, one pope (Celestine II.), nineteen cardinals, more than fifty bishops and archbishops, French, English and German, and a much larger number of those men with whom popes, bishops, and cardinals had often to contend, such as Arnold of Brescia, and many others," urged his distinguished pupils to learn Hebrew as the best mode of acquiring an elegant style, and to study the Sacred Scriptures as containing all useful knowledge, rather than study the heathen classics.<sup>9</sup> Geoffry, sub-prior of St. Barbara (*circa* 1170), writing to Peter Mangot, Monk of Baugercy, who was building a monastery, tells him that "a monastery without a library is a castle without an armoury." He is therefore to see to it "that in your armoury of defence, that which is the greatest defence of all the other defences is not wanting. That defence is the Holy Bible, wherein is contained the right rule of life and manners."<sup>10</sup>

### III. THE INCIDENTAL MENTION OF NUMEROUS MSS., SOME OF WHICH ARE STILL EXTANT.

In accordance with the decrees of the canons and the admonitions of the most distinguished ecclesiastics, we find that the Sacred Scriptures, or portions of them, were among

<sup>8</sup> Wilkins, *Concilia Magnæ Britannia et Hibernia*, i. 250, London. 1737.

<sup>9</sup> *Theol. Christ. Lib.* ii; Martene, *Thesaurus Novus Anecdotorum*, tom. v. p. 1238, Paris, 1717; Maitland, *Dark Ages*, p. 186, 3rd ed., London, 1853.

<sup>10</sup> Maitland, *ibid.* p. 200.

the most precious treasures of every monastery, and formed the most valued gifts of pontiffs and sovereigns.

When Aldhelm went to Canterbury, in 705, to be consecrated bishop of Schireburn, he heard of the arrival of ships at Dover. He went there to see them unloading, and among many other books he saw a copy of the Scriptures, containing the Old and New Testaments, which he bought, and which his biographer, William of Malmesbury, tells us was still preserved in his days.<sup>11</sup> Amongst the presents which King Offa made to the Church at Worcester (780), was a great Bible.<sup>12</sup> Theodulfus, who became bishop of Orleans *circa* 794, made with his own hand the celebrated Great Bible, which, according to Father Sirmond, is still in existence.<sup>13</sup>

Pope Leo III. (795-816) gave to one church a copy of the Gospels, bound in pure gold and studded with costly gems; and to another church one so richly ornamented with gold and precious stones that it weighed seventeen pounds four ounces.<sup>14</sup>

Abbot Angilbert, on the restoration of the Abbey of St. Riquier in A. D. 814, gave to it, amongst two hundred other books, a copy of the Gospels written in letters of gold, with silver plates profusely adorned with gold and precious stones.<sup>15</sup> Ansegisus, who became abbot of Fontenelle in 828, gave to his monastery "*Bibliothecam optimam continens vetus et novum Testamentum, cum præfationibus ac initiis librorum aureis literis decoratis,*" and to the monastery of St. Flavian, "*Pandecten a B. Hieronymo ex Hebræo vel Græco eloquio translatus.*"<sup>16</sup> He also ordered the four Gospels to be written in gold on purple vellum, in the Roman letter, which

<sup>11</sup> *Anglia Sacra*, ii. p. 21.

<sup>12</sup> *Ibid.*, i. p. 470.

<sup>13</sup> Sirm. *Op.* tom. ii. p. 763., Paris, 1696.

<sup>14</sup> Labbe's *Collection of Councils*, vii. 1083; Maitland, *Dark Ages*, pp. 72, 206.

<sup>15</sup> Mabillon, *Acta Sanctorum Ordinis S. Benedicti*, tom. v., p. 110.

<sup>16</sup> *Chron. Fontan.* ap. D'Achery, *Spicilegium*. ii., pp. 280, 281.

he lived to see completed.<sup>17</sup> Louis the Debonnaire gave, in A. D. 826, to the monastery of St. Medard, at Soissons, a copy of the Gospels, written in letters of gold, and bound in plates of exquisitely fine gold, which is still in existence, with silver plates supplied by the Abbot Ingrannus in 1168, instead of the gold ones.<sup>18</sup>

The inventory of their property, which the monks of St. Riquier made by the order of Louis the Debonnaire in 831, contains "Bibliotheca integra ubi continentur libri lxxii. in uno volumine," as well as "Bibliotheca dispersa in voluminibus xiv."<sup>19</sup> Among the spoils which the Normans took at Nantes, in 848, was a great Bible. This precious book, which was considered "the greatest treasure" of the Christians, was afterwards rescued by one of the captives, who made his escape.<sup>20</sup> In a charter of the same year (A. D. 848), from the tabulary of the monastery of St. Maur, on the Loire, we find "Donum autem confirmat Bibliotheca Veteris et Novi Testamenti."<sup>21</sup> Hincmar, who became archbishop of Rheims in 845, had one copy of the Gospels written for his cathedral in letters of gold and silver, and bound in plates of gold adorned with jewels; and had another of equal splendour prepared, for the crypt which contained the remains of St. Remigius.<sup>22</sup> Leo IV., who became pope in 847, gave copies of the Gospels, the Psalms, and the Books of Kings to the Church of the Virgin Mary, thirty miles from Rome, and to another church a copy of the Gospels, bound in silver.<sup>23</sup> Pope Benedict III. (855-858), his successor, presented to the Church of St. Calistus a copy

<sup>17</sup> Mabillon, *Acta Sanctorum Ordinis S. Benedicti*, tom. vi. p. 597.

<sup>18</sup> Mabillon, *ibid.* tom. viii. p. 888.

<sup>19</sup> *Chron. Centul.* ap. D'Achery, *Spicilegium*. ii. p. 811.

<sup>20</sup> *Frag. Hist. Armor.*, ap. Martene, *Thesaurus Novus Anecdotorum*, tom. iii. p. 830.

<sup>21</sup> Du Cange, s. v. BIBLIOTHECA.

<sup>22</sup> Flodoardi *Hist. Remen.* iii. c. v., c. ix., ap. Sirmondi *Op.* tom. iv. pp. 113, 119.

<sup>23</sup> Labbe's *Collection of Councils*, tom. viii. pp. 22, 27



of the Gospels, so ornamented with gold and precious stones, that it weighed more than seventeen pounds. About the same time the Emperor Michael sent, as a present to St. Peter's at Rome, a copy of the Gospels, bound in the most pure gold, adorned with divers precious stones.<sup>24</sup>

Everhard, Count of Friuli, by his will, dated 867 A. D. bequeathed his books to his children, leaving to his eldest son *Bibliothecam nostram*, and to his other children four copies of the Gospels, one bound in gold, one in ivory, and one in silver. To the monastery at Cisoing, founded by this Count Wulgarius, a monk, gave, among other books, a great Bible.<sup>25</sup> Wicbert, who became Bishop of Hildesheim, in 880, A. D., wrote a Bible with his own hand, which, as the historian who records the facts tells us, was still preserved in the monastery in his days.<sup>26</sup> When Brethwold became bishop of Salisbury, (*circa* 1006) he sent two copies of the Gospels to the monastery of Glastonbury where he had been a monk.<sup>27</sup> William, Abbot of Dijon, in a charter (*circa* A. D. 1014), relating to the monastery of Frutari, in Piedmont, mentions, among the presents made to the monks of Dijon, "textum unum auro, gemmis et lapidibus mire ornatum."<sup>28</sup> About the same time the Emperor Henry II. of Bavaria presented a richly decorated copy of the Gospels to the church of Mersburg; and eight years afterwards (in 1022), when recovering from an illness, he gave to the monastery at Monte Casino a copy of the Gospels, written in uncial characters, illustrated with gold, and bound in plates of the most pure gold studded with precious gems.<sup>29</sup> Abbot Bonus presented to the monastery of St. Michael, at

<sup>24</sup> *Conc.*, tom. viii. pp. 230, 231.

<sup>25</sup> D'Achery, *Spicileg.* ii., pp. 877, 879.

<sup>26</sup> "*Bibliothecam quæ adhuc in monasterio servatur, propria manu elaboravit.*" Chron. Ep. Hildesch. ap. Leib. Sc. Brun. i., p. 743; Maitland, *Dark Ages*, p. 196, &c.

<sup>27</sup> Guil. Malm. ap. Gale, tom. iii., p. 325.

<sup>28</sup> Mabillon, A. S. viii., 308, et. Ann. Ben. an. 1003, xxxiv. Maitland, *ibid.*, p. 203.

<sup>29</sup> Ditmar. ap. Leib. i., 399; Mabillon, A. S. viii., p. 400.

Pisa, of which he laid the foundation stone (*circa* 1018), a library, in which was a Bible.<sup>30</sup>

Among the presents given by Robert, King of France, to the Emperor Henry II., when the two sovereigns met on the banks of the Meuse, was a copy of the Gospels, bound in gold and precious stones.<sup>31</sup>

Ansegisus, Abbot of St. Riquier, near Abbeville (+ 1045), among the many books which he contributed to the libraries, presented —

“ Librum Evangelii, Sancti vitamque Richari,  
Ipsius studio mero argento decoravit.  
Est et Episto-liber-larum, atque Evangeliorum,  
Ipsius argento quem industria nempe paravit.”<sup>32</sup>

Olbert, Abbot of Gembloux (1048), not only gave to his monastery a copy of the Scriptures containing the whole of the Old and New Testaments, which he wrote with his own hand, but also one gold and three silver copies of the Gospels, and one silver copy of the Epistles.<sup>33</sup> When Thierry became Abbot of the monastery of St. Evroul in 1050, he caused to be written, among many other books, “all the books of the Old and New Testaments.”<sup>34</sup> Desiderius, who became Abbot of Monte Casino in 1058, and who was afterwards Pope Victor III., provided his monastery with several most splendid copies of the Gospels and Epistles.<sup>35</sup> Paul, who became Abbot of St. Albans in 1077, gave to that church “duos Textus auro et argento et gemmis ornatos.”<sup>36</sup> The charter of Hugh, Duke of Burgundy, of the same year, giving the church of Avalon to the monastery of Clugny, mentions three copies of the Gospels.<sup>37</sup>

<sup>30</sup> Maitland, *Dark Ages*, p. 46, &c.

<sup>31</sup> Glab. Rod. ap. Baron. an. 1023, iii.

<sup>32</sup> Mabillon, A. S. viii., p. 446.

<sup>33</sup> Mabillon, *ibid.* tom. viii. pp. 580-1; Fleury, tom. xii. lib. lviii. c. lii. p. 424.

<sup>34</sup> Mabillon, A. S. tom. ix. p. 136.

<sup>35</sup> Mabillon, *ibid.* tom. ix. pp. 594, 602.

<sup>36</sup> Math. Paris, *Vit. S. Alb. Abb.* tom. i. p. 51.

<sup>37</sup> D'Achery, *Spicileg.* iii., p. 412.

Stephen, Abbot of Beze, gave to his monastery in 1088 a Bible containing the Old and New Testaments.<sup>38</sup> Godfrey, Abbot of Malmesbury, stripped no less than twelve copies of the Gospels (1096) to meet the heavy tax laid by William Rufus for the purchase of Normandy.<sup>39</sup> Ralph, Bishop of Rochester (1114), gave to his church a "textum pulchre deauratum." Walter, the subsequent Bishop of Rochester (1148), gave to that church "textum Evangeliorum aureum."<sup>40</sup> Bruno, Bishop of Hildesheim (1153), gave to the library a glossed Bible, though it had already received a present of a Bible from his predecessor, Bishop Wicbert.<sup>41</sup> When Hugo Schorcheylene, a monk of Clugny, whom Henry, Bishop of Winchester (1129-1174), made Abbot of the monastery connected with Hyde Abbey, laid hands on the treasures of the church, he stripped *ten* copies of the Gospels.<sup>42</sup> John, Bishop of Bath, left (1160), among other valuable gifts, *sundry texts* of the Scriptures to the Abbey Church.<sup>43</sup> Berno, another Bishop of Hildesheim (1190), also presented to the library already mentioned a glossed Bible.<sup>44</sup> William de Longchamp, who became Bishop of Ely in 1190, pawned *thirteen* copies of the Gospels, including one of great value which belonged to King Edgar, to raise money for the redemption of King Richard.<sup>45</sup> When Ralph de Baudoke, or Baldocke, the Dean of St. Paul's, afterwards Bishop of London, visited the treasury of that church, in 1295 A. D., he found there *twelve* copies of the Gospels, richly adorned with gold, pearls, and gems. Besides these parts of the Scriptures, there were also six Epistolaria, four Evangelistaria, two Bibles, a glossed

<sup>38</sup> *Chron. Res. ap. D'Ach. Spicileg.* ii., p. 435.

<sup>39</sup> *Vita Aldh. ap. Ang. Sac.* ii., p. 44.

<sup>40</sup> *Ang. Sac.* i., pp. 342, 345.

<sup>41</sup> *Chron. Hildesch. ap. Leib. Sc. Br.* i., p. 747.

<sup>42</sup> Dugdale, *Monasticon Anglicanum*, i., p. 210.

<sup>43</sup> Dugdale, *Monasticon Anglicanum*, i., p. 186.

<sup>44</sup> *Chron. Hildesch. ap. Leib. Sc. Br.* i., p. 749.

<sup>45</sup> *Ang. Sac.* i., p. 663.

copy of the Epistles of St. Paul, a glossed copy of the Gospels of St. Luke and St. John, two copies of St. Matthew and St. Mark, with the commentary of Thomas Aquinas, and the twelve Prophets, glossed.<sup>46</sup> Thomas de Farnylaw, Chancellor of the Church at York, bequeathed at his death, in 1378, a Bible and Concordance to the Church of St. Nicolas, at Newcastle, "there to be chained for common use, for the benefit of his soul."<sup>47</sup>

Pages might easily be filled with the incidental mention of the numerous copies of the Scriptures in connection with the different monasteries, ecclesiastics of all grades, and the distinguished laity, both at home and abroad, during this period. But the above instances must suffice. It is, however, to be noticed, that many of these precious relics have survived the ravages of time and the devastations of war. On the several celebrated literary tours over Europe, which were accomplished by Mabillon, Martene, and Durand, between April 16, 1682, and January, 1719, these learned travellers found ancient MSS. of the Scriptures in almost every monastery they visited. Their Journals abound with incidental, but most interesting, records of these MSS.<sup>48</sup> Indeed, there is hardly a respectable private library of a Biblical scholar, either at home or abroad, in which some MSS. of the Bible are not to be found. Those who are interested in this department of literature, and are desirous of prosecuting this branch of study, we must refer to the works of the above-named travellers.<sup>49</sup>

<sup>46</sup> Dugdale, *Monasticon Anglicanum*, iii. pp. 309, 324. Maitland, *Dark Ages*, p. 211.

<sup>47</sup> Register of Wills at York; Buckingham, *The Bible in the Middle Ages*, p. 58.

<sup>48</sup> Mabillon's works, which embody an account of his journey, are entitled *Vetere Analecta*, Paris, 1728, fol.; and *Museum Italicum*, Paris, 1724, 2 vols. 4to.; those of Martene and Durand are *Thesaurus Novus Anecdotorum*, Paris, 1717, 5 vols. fol.; *Voyage Littéraire de deux Religieux Benedictins de la Congregation de Saint Maur*, Paris, 1717; another, *Voyage Littéraire*, Paris, 1724; and *Veterum Scriptorum et Monumentorum, dogmaticorum moralium amplissima collectis*, Paris,

IV. THE FACT THAT THE MOST DISTINGUISHED ECCLESIASTICS  
WROTE COMMENTARIES ON THE BIBLE.

Not only were the Scriptures, or portions of them, to be found in every monastery and abbey, but the most distinguished ecclesiastics of this period obtained their distinction in consequence of their being learned in the Bible, and the commentaries they wrote thereon. The Church, up to the time of the invention of printing in Europe, had an almost uninterrupted chain of celebrated Biblical students and expositors. Passing by the patristic age as unchallenged, and confining ourselves more especially to the period extending from A. D. 700 to 1450, we have, at the very outset, our immortal countrymen, the venerable Bede, a native of Wearmouth, in Durham (673-735), whose exegetical works embrace a great part of the Old and a still greater part of the New Testament;<sup>49</sup> and Flaccus Alcuin, a native of Yorkshire (735-804), who wrote commentaries on many books both of the Old and New Testament.<sup>50</sup>

In Germany we find Biblical exegesis represented still more efficiently by the renowned Rhabanus Maurus, a native of Mayence (776-856), and a pupil of Alcuin. This accomplished Hebrew, Chaldee, Greek and Latin scholar was not only made archbishop of Mayence in consequence of his erudition and exegetical labours, but was the means of imparting his learning and zeal to a number of pupils, who became distinguished Biblical expositors both in Latin and

1724-1733, 9 vols. fol. To these are to be added Maitland's work, entitled *The Dark Ages*, 3rd ed., London, 1853; and Buckingham's Treatise, entitled *The Bible in the Middle Ages*, London, 1853; to which I am principally indebted for the information connected with this period.

<sup>49</sup> The edition of Bede's Works to which the references are made is that by Dr. Giles, 12 vols. 8vo.; London, 1843-4.

<sup>50</sup> Alcuin's Works have been re-edited by Froben, 2 vols. fol.; Ratisbon, 1777.

German. The Commentaries of Rhabanus are known by the name *Allegorie in Universam Sacram Scripturam*.<sup>51</sup> As a contemporary of Rhabanus and fellow student with him at Tours under Alcuin, we have to mention Haymo, bishop of Halberstadt (778–853), who wrote commentaries on the Psalms, the Song of Songs, Isaiah, the minor Prophets, the Epistles of St. Paul, and the Apocalypse.<sup>52</sup> More distinguished still was Rhabanus Maurus' pupil, Walfrid Strabo, abbot of Reichenau, near Constance (circa 807–849), whose Commentary on the Bible, entitled *Glossa Ordinaria*, was for five hundred years the treasury of Biblical knowledge throughout the greater portion of Western Christendom.<sup>53</sup>

Of the eminent services which Olfrid, of Weissburg, another of Rhabanus Maurus' pupils, rendered to the diffusion of Biblical knowledge in the German language, we shall speak in the next Section. Returning to France, we meet with a phalanx of Biblical expositors and compilers of *catenæ*, during the eighth and ninth centuries. Among them are Smaragdus, Abbot of the Monastery of St. Michaels, in the diocese of Berdun (flour. 810), who wrote a commentary on the Prophets and another on the Gospels and Epistles;<sup>54</sup> Drepanius Florus, Deacon of the Church of Lyons (circa 780–840), who wrote a commentary on all the Epistles of St. Paul, and an Epistle on St. Jerome's version of the

<sup>51</sup> *Opera Rabani Mauri*, Colonie Agrippinæ, 6 vols. folio.

<sup>52</sup> *Explan. in omn. Psalm. et Cant.* vi. Frib. 1531; *Comm. in Isaiam*, Colon, 1531; *Comm. in xii. Proph. Min.*, Colon, 1529; *Comm. in Epist. S. Pauli*, Paris, 1556; *Comm. in Apocal. Joh.*, Col., 1529. Haymo's authorship of some of these Commentaries has, however, been disputed. Comp. Herzog, *Real-Encyclopædie für protestantische Theologie*, s. v. HAYMO, vol. v. p. 589, &c.

<sup>53</sup> Walfrid's *Glossa Ordinaria* have generally been printed with the *Postillæ* of De Lyra.

<sup>54</sup> Smaragdus' *Commentary on the Prophets* is still in MS. (comp. Mabillon, *Annales Ordinis S. Benedicti*, 350 seq.) His principal exegetical work, however, entitled *Commentarius s. Collectiones in Evangelia et Epistola, quæ per circuitum anni in templis leguntur*, was first published at Strasburg, 1536, and then by Minge, in the *Library of the Fathers*, vol. cii., pp. 1–594; Paris, 1831.

Psalms;<sup>55</sup> the celebrated Paschasius Radbert, Abbot of Corbie, an accomplished Hebrew and Greek scholar (786–865), who wrote an exposition of Psalm xlv., a commentary on Lamentations, and a commentary on St. Matthew's Gospel;<sup>56</sup> Sedulius Scotus, who wrote a commentary on Matthew, Mark, and Luke, and a commentary on all the Epistles of St. Paul;<sup>57</sup> the distinguished Christian Druthmar, of Aquitaine (flourished 820 A.D.), who was surnamed the *grammarian*, through his critical knowledge of Greek and Latin, and who wrote a valuable commentary on St. Matthew's Gospel.<sup>58</sup>

In Italy, too, Biblical exegesis was greatly promoted in the commencement of the ninth century, by Claudius, Bishop of Turin. Though a native of Spain, and appointed towards the close of Charlemagne's life as expositor of the Scriptures in Aquitaine, Claudius was recommended by Louis I. (A.D. 820) to the Bishopric of Turin, with the express purpose of purifying the Christianity of that region from superstition, and of expounding the Bible. To this effect Claudius wrote commentaries on nearly the whole Scriptures. Some historians have even regarded him not only as the forerunner, but as the founder, of the Waldenses.<sup>59</sup>

<sup>55</sup> Florus' *Comment. in omnes Pauli Epistolas*, is incorporated in the Basle (1558) and the Cologne (1612) editions of Bede's Works, having been erroneously ascribed to this venerable church historian. His *Epistola ad Hydraldum Abbatem de Psalterii emendatione*, is given in Mai's *Scriptorum Veterum Nova Collectio*, vol. iii., p. 2, 251 seq. Comp. Ersch und Gruber, *Allgemeine Encyclopädie*, s.v. *Florus*, section i., vol. xxv., p. 411, &c.

<sup>56</sup> Radbert's works were first published, in one vol. folio, by Sirmond, Paris, 1618, and are now incorporated in Minge's *Patrology*, vol. cxx.

<sup>57</sup> Sedulius Scotus' exegetical work on the Gospels was published by Cardinal Mai, in *Scriptorum Veterum Collectio nova*, tom. ix.; and the *Collectanea in omnes Epistolas S. Pauli*, first appeared in Basle, 1528, then in the *Bibliotheca Max.* tom. vi. Leyden, 1677.

<sup>58</sup> The first edition of Druthmar's *Commentary on St. Matthew*, which is now lost, appeared at Strasburg, 1514. The commentary was then republished at Hagenau, 1530, and in the *Bibliotheca Vet. Patrum*, tom. xv.

<sup>59</sup> For the Life and works of Claudius, we must refer to Schmidt's article in Herzog's *Real-Encyclopädie für protestantische Theologie*, vol. ii., p. 714, &c.

Placidus, of Verona, who wrote a commentary on Exodus, which shows that he was not only acquainted with the writings of St. Jerome, St. Augustine, Gregory the Great, and Bede, but that he was an independent thinker, and had a knowledge of Hebrew.<sup>60</sup> Atto, or Hatto, Bishop of Vercelli (+ 960), who wrote a commentary on the Pauline Epistles.<sup>61</sup>

The Greek Church, too, contributed materially to Biblical exegesis in the tenth, eleventh, and twelfth centuries. During this period, we have the celebrated Œcumenius, Bishop of Tricca, in Thessaly (flourished 980), to whom Biblical literature is indebted for valuable commentaries on the Acts of the Apostles, the Pauline Epistles, and the Catholic Epistles, whose expositions are grammatical, and who may be regarded as having started the series of *Catenæ*.<sup>62</sup> The still more celebrated and liberal minded Theophylact, Archbishop of Achrida, in Bulgaria (+ 1108), who wrote commentaries on the Minor Prophets, the Gospels, the Pauline Epistles, the Acts, and the Catholic Epistles.<sup>63</sup> And Euthymius Zigabenus, or Zigadenus, monk of the convent of the Virgin Mary at Constantinople (flourished 1100), and friend of the Emperor Alexius Comnenus, who wrote commentaries on the Psalms, the Gospels, the Pauline Epistles, and the Catholic Epistles.<sup>64</sup>

In England, where Biblical exegesis had been neglected

<sup>60</sup> Comp. Meyer, *Geschichte der Schrifterklärung*, vol. i., p. 72; Göttingen, 1802.

<sup>61</sup> Atto's works were collected by Buronzio, and published in 1768, 2 vols. folio.

<sup>62</sup> The works of Œcumenius have been published with a Latin translation, by Morell; Paris, 1631, 2 vols. folio.

<sup>63</sup> Theophylact's collected works have been issued in 4 vols. folio; Venice, 1754-63.

<sup>64</sup> Euthymius' *Commentary on the Psalms* has been published in Greek, with a Latin translation, in the fourth volume of Theophylact's works, mentioned in the preceding note. The commentary on the Gospels has been edited by Chr. F. Matthæi, entitled *Comm. in IV. Evang. Græce et Latine*, Lips. 1792, 4 vols. The commentaries on the Pauline and Catholic Epistles are still in MS. Comp. Gass, in Herzog's *Real-Encyclopædie für protestantische Theologie*, s. v. EUTHYMIUS, vol. iv. p. 249, &c.



since the days of Bede and Alcuin, we now find Lanfranc, Archbishop of Canterbury (1070-1089), exerting himself to the utmost to revive the study of the Scriptures. He not only caused Biblical MSS. to be copied and multiplied, but wrote commentaries on the Psalms and the Pauline Epistles.<sup>66</sup> Second to the Archbishop was Gilbert Foliot, Bishop of London (+ 1187), who wrote a commentary on the Songs of Solomon.<sup>67</sup>

It is, however, in France and Germany where we find Biblical exegesis prosecuted most vigorously. The impetus given to it by Charlemagne seems never to have ceased, in spite of the all-absorbing scholastic philosophy and the distracted state of the Church. This will especially be seen when we come, in the next Section, to speak of the different translations of the Scriptures into the vernacular of the people, executed during this period. Of those who expounded the Bible, we have to mention Anselm, of Laon (+ 1117), who was pupil of Anselm the celebrated Archbishop of Canterbury, in the reign of William Rufus and Henry I., and whose interlineary glosses on the whole Bible, entitled *Glossa Interlinearis*, together with the *Glossa Ordinaria* of Walfrid Strab, were for centuries the general treasury of Biblical knowledge. He also wrote commentaries on different portions of the Bible.<sup>68</sup>—Rupert, of Deutz (+ 1185), who wrote commentaries on many portions both of the Old

<sup>66</sup> It is to be remarked that some have questioned Lanfranc's authorship of the commentary on the Pauline Epistles; and that the commentary on the Psalms has not as yet come to light. His works were first edited by D'Achery, Paris, 1688; and then again by Giles, Oxford, 1844-5, 2 vols.

<sup>67</sup> Gilbert Foliot's *Commentary on the Song of Songs* was edited by Patr. Junius; London, 1638.

<sup>68</sup> Anselm's *Glossa Interlinearis* were published in Basel, 1502-1508, and in Antwerp, 1634. For his other commentaries, see *Histoire Littéraire de la France*, tom. x., p. 182; Herzog, *Real-Encyclopädie für protestantische Theologie*, s. v. ANSELM, vol. i., p. 866, &c.

and New Testaments;<sup>68</sup> the celebrated Peter Lombard, Archbishop of Paris (+ 1160–1164), who wrote commentaries on the Psalms, the Song of Solomon, and the Pauline Epistles;<sup>69</sup> Hugo, of St. Victor (1097–1141), who wrote commentaries on most of the books of the Old and New Testament;<sup>70</sup> the celebrated Hugo, of St. Cler (+ 1269), also called Cardinal Hugo, who, at the request of the Chapter-General of the Dominicans, compiled a corrected text of the Vulgate from ancient Hebrew, Greek, and Latin MSS., wrote a concise commentary on the whole Bible, entitled *Postilla in universa Biblia, juxta quadruplicem sensum*—was the author of the earliest concordance to the Bible in alphabetical order—and is allowed to have been the first who divided the Vulgate into chapters;<sup>71</sup> Bonaventura, Cardinal and Bishop of Alba (1221–1274), called *the Seraphic Doctor*, who wrote commentaries on many of the books of the Old and New Testament;<sup>72</sup> Thomas Aquinas (1225–1274), styled *the Angelic Doctor*, who, besides writing many other exegetical

<sup>68</sup> The best edition of Rupert's collected works is that published at Venice, 1751, 4 vols. folio. Comp. Mabillon, *Annales Ordinis S. Benedicti*, tom. v. and vi.; *Histoire Littéraire de la France*, tom. xi., pp. 422–587, Paris, 1841; Mangold, in Herzog's *Real-Encyclopädie*, s. v. RUPERT VON DEUTZ, vol. xiii., pp. 168–177.

<sup>69</sup> Comp. *Histoire Littéraire de la France*, tom. xii.; Landerer, in Herzog's *Real-Encyclopädie*, s. v. LOMBARDUS, vol. viii., pp. 466–476.

<sup>70</sup> Hugo of St. Victor's works were first published at Paris, 1528, 2 vols. folio; then at Venice, 1588; at Cologne, 1617; and at Ronen, 1648, 8 vols. folio.

<sup>71</sup> Cardinal Hugo's recension of the Vulgate, which is preserved in the Library of Nuremberg, is entitled *Liber de correctionibus novis super Biblia, ad sciendum quæ sit verior et communior litera, Reverendissimi patris et domini D. Hugonis, sacre Rom. eccl. presbyteri cardinalis, sacre theologie professoris et de ordine predicatorum*. His *Postilla in universa Biblia* have been published several times: in Basle, 1487, 1498, 1504, 6 vols. folio; Paris, 1508, 1538, 6 vols. folio; Venice, 1600, 5 vols. folio; Cologne, 1621, 8 vols. folio. The *Sanctorum Bibliorum Concordantiæ*, which is sometimes called *Concordantiæ S. Jacobi*, from the fact that Hugo was assisted in it by some of the Dominicans of St. James' Monastery, where he resided, and sometimes is styled *Concordantiæ Anglicana*, because some English Dominicans, resident in Paris, afterwards added the various passages, has also been published several times: Lyons, 1540, 1551, 4to; Basel, 1543, 1551, folio.

<sup>72</sup> Bonaventura's collected works were first published in Rome, 1588–1596, 8 vols. folio.

works, is the author of the celebrated *Catena Aurea* on the four Gospels;<sup>73</sup> Richard, Abbot of St. Victor, a native of Scotland (+ 1178), who wrote a description of Solomon's Temple, on the apparent contradictions between the books of Kings and Chronicles, and commentaries on Ezekiel, the Psalms, the Song of Solomon, and the Apocalypse;<sup>74</sup> Albert the Great (1200–1280), who wrote commentaries on different parts of the Old and New Testament;<sup>75</sup> Raymond Martin (*circa* 1220–1287), the eminent Spanish Dominican, whose immense erudition in Hebrew, Chaldee, and Rabbinic literature made him the oracle on Jewish learning in the middle ages, and who wrote on the Messianic prophecies of the Old Testament;<sup>76</sup> the famous Nicolas de Lyra (*circa* 1270–1340), the forerunner of the Reformation, who wrote the celebrated commentary on the entire Bible, entitled *Postilla Perpetua in Univerſam Bibliam*;<sup>77</sup> Jacob Perez de Valencia (1420–1490), who wrote elaborate commentaries on different portions of the Bible.<sup>78</sup>

It must be borne in mind that our object in enumerating these Commentaries is not to pass any criticism on their respective merits as exegetical productions, or to examine the soundness of the hermeneutical rules propounded by their authors, but simply to show that the Bible, so far from being unknown or withheld from the public during this period, actually formed the principal subject of study on the part of the most eminent dignitaries of the church. To

<sup>73</sup> Thomas Aquinas' works have been repeatedly printed.

<sup>74</sup> The first edition of Richard's works is that published at Paris, 1528; the best is the one published at Rouen, 1650, folio.

<sup>75</sup> His works have been edited by the Dominican, Peter Jammi; Lyons, 1651, 21 vols. folio.

<sup>76</sup> Raymond Martin's work is entitled *Pugio Fidei*, the best edition of it is that by Carpzov; Leipz. 1687.

<sup>77</sup> For an account of Nicolas de Lyra and his works, see Kitto's *Cyclopædia of Biblical Literature*, s. v. LYRA.

<sup>78</sup> For Jacob Perez de Valencia, see Ginsburg, *The Massoreth Ha-Massoreth* of Elias Levita. p. 47. Longman, 1867.

know the Scriptures was regarded as the most praiseworthy, the highest, and the most valued acquirement. Hence the wisest and most effectual means were adopted, in the absence of printing, both to multiply MSS. and to familiarise the spiritual teachers of the people with the contents of the Scriptures.

We cannot do better than give here the practice of the Benedictines, as described by one of their brothers, Abbot Ulric, senior monk of Clugni (+ 1093). William, Abbot of the monastery of Hirschau, being desirous to introduce into his monastery, as well as into the other monasteries of Germany, every custom which might be for the spiritual benefit of the inmates, requested Abbot Ulric, who had been sent on some business to Germany, to write out for him the rules of the monastery of Clugni. This Ulric promised to do, provided Abbot William would write down what he wanted to know in the form of questions. Accordingly Ulric wrote a book, between A. D. 1077 and 1093, which is still in existence, and which contains his replies, together with Abbot William's questions. The very first chapter, entitled *Quomodo Testamentum legatur utrumque*, treats upon the reading of the Scriptures, and begins as follows :—

“ *Question.*—I hear that your lessons in the winter and on the common nights are very long; will you please to state at once the manner in which the Old and New Testament is read, both in summer and winter?

“ *Answer.*—To begin with the most ancient of the books, that is the Octateuch. This book, according to general custom, and as it is in other churches, is appointed to be commenced on Septuagesima. On the Sunday itself there are read short lessons, except that for the first the whole of the prologue of St. Jerome is read; but during the following nights the lessons are so much increased that in one week the whole book of Genesis is read through in the Church only. On Sexagesima, Exodus is begun, and, together with the other books which are read, it also is read both in the church and in the refectory, in such a manner that where the lesson finished one day shall be the

beginning of the lesson for the next day; and the whole Octateuch is read through, if not before, at least by the beginning of Lent. Lessons are, however, taken from it for the Sundays in Lent; but on the other nights during that period St Augustine's exposition of the Psalms, and especially of the Song of Degrees, is read; and as the nights then grow shorter and shorter, so do the lessons. Care must, however, be taken that they are not so abbreviated as not to allow sufficient time for the brother who goes the round, both within and without the choir, with his dark lantern to see if any one has gone to sleep during the lesson. In the Passion of our Lord, the prophet Jeremiah is read, and, as before, the prologue forms the first lesson. It is, however, read in the Church only, and before Holy Thursday it is finished as far as Lamentations. In Easter week the Acts of the Apostles are read, and for one week only, during which, from the shortness of the nights, it is impossible that much should be read. After this, for two weeks, we read the Apocalypse and the Canonical Epistles, finishing them by Ascension Day. Then the Acts of the Apostles are again appointed, and again, read from the beginning, as if they had not been read before, until Pentecost. These same books, however, are not the less read regularly and throughout in the refectory, where also are read, in their appointed season, the Books of Kings, of Solomon, of Job, of Tobit, Judith, Esther, Ezra, and the Maccabees, which are read only in the refectory, and not at all in the Church, except the short extracts which may be made from any of them for the Sundays. From the calends of November, the lessons for common nights are doubled. The prophet Ezekiel is appointed to be read in the Church only, and is customarily finished before the Feast of St. Martin; and although we celebrate the octave of that feast with singing and with other solemnities, yet the prophetic lessons are not changed, nor indeed are they on other octaves unless they would make twelve lessons. Then the prophet Daniel and the twelve Minor Prophets, which would not suffice to fill up the necessary time if we did not add, after the last of them, the homilies of the blessed Pope Gregory on Ezekiel. In Advent, Isaiah the prophet is appointed, and when I inquired about this, and wished to learn in how many nights it ought in strictness to be read through, I could not learn from anybody, and I can only say what I recollect to have heard and seen. When I was there it was sometimes read through in six common nights. After this follow the Epistles of Pope Leo on the Incarnation of our Lord, and other discourses of the holy fathers, and chiefly of St. Augustine. The Canonical Epistles are appointed for that Sunday which first occurs after Innocents' Day, provided that day is neither the Circumcision nor the Anniversary of the Lord Odilo. And here, again, I must say as I did of the prophets, for different

persons think differently, and simply state what I saw. Such an epistle as that of the Romans was read through in two common nights; and when one of the monks who portioned out the lessons had made them shorter, he was reproved by our seniors in chapter. If, however, it should happen that the Epistles were finished before Septuagesima, they read St. John Chrysostom's Exposition of the Epistle to the Hebrews. Now you see I have in some fashion gone round the circle of the year."<sup>79</sup>

The custom described in this simple narrative was not an isolated one, confined to the monks of Clugni, but obtained in all the Benedictine monasteries; and similar practices prevailed in the monasteries of the other brotherhoods. It is this constant reading of the Bible which made the writers of the middle ages such thorough masters of the Biblical language, as may be seen from the most cursory glance at their writings. Not only are their theological and ecclesiastical productions made up of Scripture expressions, but their histories, biographies, legal instruments, and private correspondence are permeated with the ideas, the imagery, and the phraseology of the Vulgate. Indeed, so entirely is the tone of their composition, and so wholly is their vocabulary Scriptural, that their writings cannot be properly understood by those who are not familiar with the language of the Vulgate.

#### V. THE DIFFERENT TRANSLATIONS OF THE SCRIPTURES INTO THE VERNACULAR OF THE PEOPLE.

Side by side with the comparatively wide circulation of the Scriptures during this period in the ecclesiastical languages, which were also the languages of the educated laity, was the diffusion of different translations in the vernacular of the people. As the design of this Essay, which is to trace the gradual development of our English Bible, not only

<sup>79</sup> Comp. D'Achery, *Spicilegium*, 641 i. , 650; Mabillon, *Acta Sanctorum Ordinis S. Benedicti*, tom. vii. 159; Maitland, *Dark Ages*, 332-341; Buckingham, *The Bible in the Middle Ages*, 19-21.

involves a description of the state of the Scriptures up to the time of King James I., but makes it necessary to point out the relationship sustained by the different versions to each other, we shall have to examine the nature and merits of those ancient translations, which form, more or less, the basis of succeeding versions.

The numerous versions of the Bible, which became the heritage of the different communities of the Church in the various parts of the world, from the earliest time to the invention of printing with moveable type (*circa* A.D. 1450), are divisible into two classes — Oriental and Occidental. To the Oriental class belong the Greek, the Samaritan, the Syriac, the Chaldee, Arabic, Persian, Egyptian, Æthiopic, Armenian, and Georgian versions; whilst to the Occidental class belong the *Vetus Latina*, the Vulgate, and the translations which were made during this period into the different languages of the West. We have to remark, at the outset, that with the exception of those versions made by the Jews for the use of their brethren, or which were made with their direct assistance, all the translations of the Old Testament and nearly all of the New Testament, which obtained during this period, are secondary. They are translations of translations, having been made either from the Greek version, or from the Latin Vulgate, or from the Syriac. Hence, simply to exhibit the dependence of the succeeding versions upon the ancient Jewish translation is not enough. To see how far this dependence has removed the later versions from the original text, it is absolutely necessary to ascertain the hermeneutical rules by which the first translators were guided in making the primary versions.

All primary versions belong to the first division, that is the Oriental class; and embrace the group of the Greek versions, the Chaldee versions, the Samaritan version, and the Syriac. Before, however, we enter upon an examination

of the merits of these versions, it is absolutely necessary to point out the views which the ancient translators had about the Bible, and the exegetical rules by which they were guided.

The Bible was not regarded by the Jews as a finished and closed book of antiquity, recording obscure events and obsolete opinions in figures and symbolism of by-gone days, and requiring mental transposition into the remote times in which it was written, in order to interpret the peculiar ideas of a past age; but it was looked upon as the everlasting, the ever-living, and the ever-speaking word of God. Like the rock and the stream which always followed the Israelites in their wanderings, and never failed to supply them with water;<sup>80</sup> so the Bible, which was their constant companion under all the vicissitudes of the commonwealth, never ceased to furnish them with spiritual food for the maintenance and preservation of the body politic. It was the only rule of practice in the political and religious government of the Jews.

All the laws required for the administration of justice, all the regulations necessary for leading a holy life, all the practices which were called forth by the different circumstances of changing times, all the achievements of Gentile nations in mental pursuits, all new discoveries in science, were believed either to be expressly stated or tacitly implied in the Bible. No matter what statute or ordinance was demanded by the ever-shifting circumstances of the people, it was believed that the Bible contained it, and that it only required a proper knowledge of the peculiar exegetical canons to propound it. Hence the motto of the expositors and administrators of the Mosaic code, "Turn it [*i. e.*, the inspired

<sup>80</sup> For the tradition about the rock and the stream which followed the Israelites in their wanderings, see 1 Cor. x. 4; the Chaldee Paraphrase of Onkelos, and the two Jerusalem Targums, on Numb. xxi. 19; Rashi on Numb. xx. 2, 10; and comp. also below, under *Chaldee Versions*.



code] over and over again, for everything is in it, and will be discovered therein." <sup>81</sup>

The laws which were called forth by different exigencies, and developed themselves in the course of time, were either deduced from or introduced into the Mosaic code by the spiritual heads of the Jews. Some of these enactments, or *Halachoth* <sup>82</sup> as they are called, are coeval with the statutes in the Pentateuch; <sup>83</sup> some were passed by the Scribes or the Great Synagogue, <sup>84</sup> and some obtained at a later period. For centuries these laws were transmitted orally, and it was only now and then that a few of the *Sopherim*, or Scribes wrote down some of them, or indicated them by some signs or hints in their scrolls of the Bible, to assist their memory. These marginal glosses in the MSS. of the Scriptures, became afterwards the basis of the *Massorah*. <sup>85</sup> Gradually,

<sup>81</sup> *Mishna Aboth*, v. 22.

<sup>82</sup> *Halachoth*, = הלכות (from הלך, to go), denotes the rule by which to go, the binding precept, the authoritative law, being equivalent to the Hebrew מִשְׁפָּט, for which the Chaldee substitutes it in Exod. xxi. 9.

<sup>83</sup> Comp. Dent. xvii. 11.

<sup>84</sup> The Great Synagogue or Synod (בֵּית־הַדְרָוֶלָה Synagoga magna), to which reference is here made, was instituted by Nehemiah (comp. Neh. x. 1-10, *Midrash Ruth*, cap. iii. fol. 45 b; *Jerusalem Shebiith*, v. 1, 35 b), and continued till the death of Simon the Just (B. C. 300), who was the last member of it. It consisted of one hundred and twenty members, comprising the representatives of the following five classes of the Jewish nation:—i. The chiefs of the Priestly divisions (רִאשֵׁי בֵּית); ii. The chiefs of the Levitical Families (רִאשֵׁי הַלֵּוִיִּים); iii. The Heads of the Israelite Families (רִאשֵׁי הָעָם); iv. Deputies from the different towns; and, v. The distinguished men of all ranks (מְבִינִים). They are all divided into ELDERS (זְקֵנִים, *πρεσβύτεροι*) and SCRIBES (סוֹפְרִים, *γραμματεῖς*); and among the many important enactments and institutions which are ascribed to them are—i. The compilation of the Hebrew canon and the various readings; ii. The composition of the Book of Esther; iii. The introduction of fixed formulæ of prayer; and, iv. The foundation of colleges. Comp. Kitto's *Cyclopædia of Biblical Literature*, s. v., SYNAGOGUE, THE GREAT.

<sup>85</sup> The *Massorah*, which is divided into *Massorah magna* (מַסְרֵד הַגְּדוֹלָה) and *Massorah parva* (מַסְרֵד הַקְּטָנָה), contains the traditional and authoritative glosses on the external form of the Hebrew text. The *Massorah magna*, which is generally given in the margin above and below the text, as well as at the end of the Rabbinic Bibles, is more extensive, and quotes in full the passages which come under the same rubric; whilst the *Massorah parva*, which is written in the margin at the side of the text, or in the margin between the columns containing the Hebrew text and the Chaldee paraphrase, simply indicates the number of the passages which come

however, these *Halachoth*, or enactments, were collected and fully written down. They are now embodied in the Mishna, in the Jerusalem and Babylon *Gemaras* or Talmuds,<sup>86</sup> in the ancient commentaries on the different books of the Pentateuch, called *Michilta*,<sup>87</sup> *Siphra*,<sup>88</sup> and *Siphre*,<sup>89</sup> and in the Homiletic or Hagadic expositions, called *Midrashim*.<sup>90</sup>

under the same rubric, or hints at other glosses in an abbreviated form, without giving the reference. It was for want of space in the margin of the Hebrew text that the Massorah magna had to be divided into two parts. The divisions thus obtained are respectively denominated—i. מסורה גליונית, MASSORAH MARGINALIS, because this portion of it is given above and below the text; and, ii. מסורה סופית, MASSORAH FINALIS, because this portion is given at the end of the Rabbinic Bibles.

<sup>86</sup> The *Mishna* (משנה from שנה, to repeat, to explain) = Deuterosis or Exposition, is the name given to the collection of the traditional laws (= *Halachoth*, הלכות), which were called forth in the course of time, or deduced from the Bible, and edited by R. Jehudah, the Holy (circa 180 A.D.). It is divided into six orders or books (סדרים), consisting of sixty-three treatises or tractates (מסכתות), and five hundred and twenty-five sections or chapters (פרקים), as follows:—i. ON SEEDS (ורעים); ii. ON FESTIVALS (מועד); iii. ON WOMEN (נשים); iv. ON DAMAGES (נזקין); v. ON HOLY THINGS (קדשים); and vi. ON PURIFICATIONS (טהרות). This Mishna, like the Mosaic Code, became the subject of discussion, study, and exposition; and the authoritative expositions of the Mishna are the two *Talmuds* (תלמוד, teaching, exposition, from למד, to teach), or more properly *Gemaras* (גמרא from גמר, to complete), one proceeding from Palestinian expositors (circa A.D. 250), and hence called the Jerusalem Talmud; and the other from Babylonian authorities (circa A.D. 540), and hence called the Babylonian Talmud. Neither the Jerusalem Talmud, which consists of one volume fol., nor the Babylonian Talmud, which consists of twelve volumes fol., has ever been translated into any language, with the exception of *Tract Berachoth*, which was published with a German version by Pinner, Berlin, 1842, and some desultory portions by different literati. The Mishna has appeared in Latin, with the original and elaborate annotations by Sarrenhusius, six vols. fol., Amsterdam, 1698–1708; in German by Rabe, in six vols., Ansbach, 1760–1768; and by Jost with the original six volumes 4to, Berlin, 1832–1834. A very incomplete English translation made by De Sola and Raphall, appeared in London, 1845.

<sup>87</sup> The *Mechilta* (מכילתא, measure, norm, rule), is a commentary on Exodus older than the Mishna, and contains some of the most ancient Halachoth. It was first compiled under the influence of R. Ishmael b. Elisa (circa 90 A.D.), but was afterwards re-edited and altered. It consists of nine Tractates (מסכתות), subdivided into seventy-seven sections (פרקים), as follows:—Tractate i. called *D'Pascho* (דפסחא), embraces Exod. xii. 1—xiii. 16, in eighteen sections; Tractate ii. called *D'Vajehi Beshalach* (דוידו בשלח), on xiii. 17—xiv. 31, is in six sections; Tractate iii. called *D'Shira* (דשירא) on xv. 1–21, in ten sections; Tractate iv. called *Vajisa* (ויסע) on xv. 22—xvii. 7, in seven sections; Tractate v. called *D'Amalek* (דעמלק), on xvii. 8—xviii. 27, in four sections; Tractate vi. called *D'Bachodesh* (דבחדש), on xix. 1—xx. 22, in eleven sections; Tractate

It will readily be seen that, since the legal enactments which the ever-changing circumstances of the people called forth; the halo, and the sacred legends with which the Jewish people invested their venerated patriarchs and national heroes; and the contumelies and execrations which in the course of time gathered round the hated names of

vii. called *D'Nesikin* (דְּנִסִּיקִין), on xxi. 1—xxii. 22; and Tractate viii. called *D'Kaspo* (דְּכֶסֶּפֶה), on xxii. 23—xxiii. 19, are in twenty sections; and Tractate ix. called *D'Shabtho* (דְּשַׁבְּתָהּ), on xxiii. 12—17—xxxv. 1—3, is in one section. The best edition of the *Mechilta*, is the one recently published, with a critical commentary by Weiss, Vienna, 1865.

<sup>88</sup> The *Siphra* (סִפְרָא, *the Book*) is a commentary on Leviticus. It is also called *Siphra D'he Rab* (סִפְרָא דִּבֵּי רַב), *Siphra of the School of Rab*, because the author of it is Rab, = Abba Areka, the founder of the celebrated academy at Sara, of which he was the president twenty-eight years, 219–247, A.D. It is also called *Beraktha shel Torah Cohanim* (בְּרִיתָא שֶׁל תּוֹרַת כֹּהֲנִים), because the book of Leviticus, which it expounds, is called by the Jews *Torath Cohanim* (תּוֹרַת כֹּהֲנִים) = *the Code of the Priests*. The *Siphra* consists of ten divisions, corresponding to and named after the Sabbatical lessons, into which the Book of Leviticus is divided. These Pericopees are again subdivided into sections (פְּסָקִים) and chapters (פְּתֻלִּים), as follows: Pericopee i., denominated *Vajikra* (וַיִּקְרָא), embracing Levit. i. 1—v. 26, consists of two treatises, one called *D'Nedaba* (דְּנִדְבָּה), is on i. 1—iii. 17, has fourteen sections, and twenty chapters; and the other *D'Choba* (דְּחֻבָּה), on iv. 1—v. 26, has thirteen sections and twenty-three chapters. Pericopee ii., called *Zav* (צו), vi. 1—viii. 36, has eleven sections and eighteen chapters. Pericopee iii., called *Shemini* (שְׁמִינִי), ix. 1—xi. 47, has ten sections, and eleven chapters. Pericopee iv., called *Tazriah* (תֹּזְרִיעַ), xii. 1—xiii. 59, has ten sections, and sixteen chapters. Pericopee v., called *Mezarah* (מִצְרָע), xiv. 1—xv. 33, has five sections, and nine chapters. Pericopee vi., called *Achre Moth* (אַחֲרֵי מוֹת), xvi. 1—xviii. 30, has nine sections, and thirteen chapters. Pericopee vii., called *Kedoshim* (קְדוֹשִׁים), xix. 1—xx. 27, has ten sections, and twelve chapters. Pericopee viii., called *Emor* (עִמּוֹר), xxi. 1—xxv. 23, has fourteen sections, and twenty chapters. Pericopee ix., called *B'har* (בְּהָר), xxv. 1—xxvi. 2, has six sections, and nine chapters: and Pericopee x., called *B'chukosai* (בְּחֻקֵּיהֶם), xxvi. 2—xxvii. 34, has five sections, and thirteen chapters. The best edition of the *Siphra* is the one published at Warsaw, 1866.

<sup>89</sup> The *Siphre* or *Siphri* (סִפְרֵי = *the Book*), also called *Siphri D'he Rab* (סִפְרֵי דִּבֵּי רַב), because Rab, the compiler of the *Siphra*, is also the author of this work, is a commentary on Numbers and Deuteronomy. The commentary on Numbers is divided into one hundred and sixty-one chapters, and that on Deuteronomy into three hundred and fifty-seven chapters. A very beautiful edition of it, with a critical commentary, has been published by Friedmann, vol. i., Vienna, 1864.

<sup>90</sup> Of the *Midrashim*, or Hagadic commentaries on the Bible, we shall only mention—i. The *Midrash Rabbah* (מִדְרַשׁ רַבָּה), on the Pentateuch and the Five Megilloth, which is ascribed to Oshaja b. Nachmani (flourished 278 A.D.), and which derives its name from the fact that it begins with a Hagada of Oshaja Rabba (רַבָּה), of which *Rabbah* (רַבָּה) is the plural. The best edition of this Midrash is that

their enemies, were all believed to be indicated in the Bible itself by some superfluous letter, or redundant word, or the repetition of a phrase, or the peculiarity of a construction; fixed hermeneutical canons had to be adopted for the interpretation of the Scriptures; that when the Bible had to be translated into a foreign tongue these canons would be employed, and that the laws and legends which were believed to be indicated in the original would more or less be expressed in the translation. Now these rules, which were gradually developed by the expositors and administrators of the law, were afterwards collected, elaborated, and systematised by the great authorities of the Jewish nation.

The first who brought any of these exegetical rules together into a sort of system was Hillel I., or the Great, (circa 75, B. C.—36, A. D.) This distinguished Rabbi, who is styled the second Ezra, the restorer of the Law, and under whose patriarchate Christ was born, in endeavouring to show that the traditional enactments which developed

published by Schrentzel, Stettin, 1863. ii. The *Pesikta* (פסיקתא), also called *Pesikta Rabbathi* (פסיקתא רבתי), consists of lectures on the Pericopes of the feasts and fasts, or *Haphtaroth*. This Midrash, which was compiled by Kahana b. Tachlifa (380–411 A. D.), and was lost for several centuries, was recast in 846. The best edition of it is that by Isser, Breslau, 1831. iii. *Midrash Tanchuma* (מדרש תנחומא), that is the Midrash compiled by Tanchuma b. Abba (flourished A. D. 440), also called *Midrash Jalamdenu* (מדרש ילמדנו), from the fact that eighty-two sections begin with the formula *Jalamdenu* (ילמדנו) = *it teaches us, we are taught*. It extends over the whole Pentateuch, and is chiefly a compilation of the foregoing Midrashim. The best edition of it is that published by Chan. Sandel b. Joseph, Wilna, 1833. iv. *Pirke D'Rabbi Eliezer* (פירי דרבי אליעזר), also called *Boraita*, or *Agada D'Rabbi Eliezer* (אגדה דרבי אליעזר), because Eliezer b. Hyrcanus, who flourished about A. D. 70, is its reputed author. It treats on the principal events of the Pentateuch, and consists of fifty-four sections. A convenient edition of it appeared in Lemberg, 1858. v. Midrash on Samuel, in thirty-two sections, consisting chiefly of excerpts from older works. It has been published with the Midrash on Proverbs, by Isaac Cohen, Lemberg, 1861. vi. Midrash on the Psalms; and vii. Midrash *Jalkut*, also called *Jalkut Shimoni* (ילקוט שמעוני) = *the compilation of Simeon*, who flourished about the middle of the eleventh century. This Midrash extends over the whole of the Hebrew Scriptures. The edition referred to in this Essay, is that published at Frankfort-on-the-Maine, 1687. For a more detailed description of the nature and import of the Midrashim, we must refer to Kitto's *Cyclopædia of Biblical Literature*, s. v. MIDRASH.

themselves in the course of time, and which the Sadducees rejected as human inventions, were deduced from the Mosaic code, adduced the following seven canons, whereby the Scriptures are to be interpreted:—

1.—*Inference from minor to major.*<sup>91</sup> Thus, for instance, Exod. xxii. 18 does not state whether the borrower of a thing is responsible in case it is stolen; verses 9–11, however, declare that the depositary, who can free himself from making restitution in case of death or accident, must nevertheless make restitution in case of theft; whilst in verse 18, the borrower is even obliged to make restitution in case of death or accident. Hence the inference is made from the minor (*i. e.*, the depositary) to the major (*i. e.*, the borrower), that the latter (in xxii. 18) is all the more responsible for theft.<sup>92</sup> The object of the inference (*i. e.* the major), however, must never be treated more rigorously than the subject from which the inference is made (*i. e.* the minor), as is evident from Numb. xii. 14, 15, where the argument, *de minore ad majorem*, is employed by God himself, and where, as the Talmud rightly remarks, Miriam, who offended her heavenly Father, is not treated more rigorously than a daughter who offends her earthly parent.<sup>93</sup>

2.—*Inference from a comparison of words or ideas.*<sup>94</sup> When a similar expression occurs in the Bible in connection with two subjects, the same law is under certain circumstances applied to both. Thus, for instance, the Mosaic code does not say whether, in case the evening of the Passover (ערב פסח) falls on a Sabbath the paschal-lamb might be slain without violating the sanctity of the day. Since, however, in the case of the daily sacrifice, which it is distinctly declared may be offered on the Sabbath

<sup>91</sup> קל דומור.

<sup>92</sup> *Baba Mezia*, 95 a.

<sup>93</sup> *Baba Kama*, 28 a; comp. also *Mishna Baba Kama*, li. 5.

<sup>94</sup> גוריה שיה.

(Numb. ix. 2), the expression "to offer it (במזערו) in its time" (Numb xxviii. 2) is used; and since the same expression is also used with regard to the paschal-lamb, "let the children of Israel keep it (במזערו) in its time," it is inferred that the term "*in its time*" enjoins the offering to be made at its appointed time, whether it be a week-day or Sabbath, and that its use in connection with the paschal-lamb necessitates its being offered up at the appointed time, irrespective of the Sabbath.<sup>66</sup>

Three distinctions, however, must be observed in the application of this exegetical law: *a*, Either the expression is superfluous in both passages, in which case there can be no objection to this comparison of words, inasmuch as the very employment in *both* places of *the same* or a *similar* superfluous expression indicates a design; or, *b*, The expression is necessary in both places, in which case no comparison is made, inasmuch as the נזירה שוה is *eo ipso*, null and void, because the expressions are wanted to explain the sense, and cannot therefore be employed for the deduction of particular laws; or, *c*, One of the expressions is superfluous, in which case the inference may be made, provided no objection can be raised against it from another law, which has assigned a distinction to the subject of comparison.<sup>66</sup>

3.—*Building of the father, or the chief law from one verse.*<sup>67</sup> That is to say, when a law is applied in one verse of the Bible to any two subjects which possess the same property, though they belong to different classes, the property in question is made the starting point, and is constituted a rule (= אב, *father*) for all subjects which possess this property. Thus, in Levit. xv. 4, mention is made of two subjects, viz., *the bed and the chair* (מִשְׁכַּב וּמוֹשָׁב),

<sup>66</sup> *Jerusalem Pesachim*, 66 a; *Pesachim*, vi. 1; *Tosiphta Pesachim*, cap. iv.

<sup>66</sup> *Jebamoth*, 70 b.

<sup>67</sup> בְּנוֹן אֵב מִכְּרֹב אֶחָד.

which, though belonging to two different classes, have the common quality of serving for repose. Now since these are declared to be unclean when touched by him who has an issue, and to have the power of defiling both men and garments through contact, this common property of serving for repose is constituted a rule; and it is inferred that all things which serve for resting are rendered unclean by the touch of him who has an issue, and then defile both men and garments by contact. Again, when it is said that God in addressing Moses called unto him, "Moses! Moses!" (Exod. iii. 4,) it is concluded that whenever God spoke to Moses he addressed him in the same manner. This hermeneutical law is called בנין אב, *the building of the father*, because it requires two subjects, and something whereby they are connected, thus resembling a building with two walls joined together by a covering.

4.—*Building of the father, or a principle deduced from two verses.*<sup>98</sup> This rule is in principle the same as the foregoing one, only that it constitutes two different subjects of the same distinguishing feature, occurring in two different verses, as the rule within the range of which all other subjects come which possess the one distinguishing feature. Thus, for instance, the two commands, viz., "to light the lamps in the sanctuary" (Levit. xxiv. 1-4), and "to put out of the camp every leper" (Numb. v. 1-4), are totally different in regard to the description of time, since in the case of the first it is described as binding *for ever*, or for all times; whilst with regard to the second it is said that the command was enforced *at once*. But because these two enactments are alike introduced with the expression וצ, *command*, they are made the basis for all other statutes introduced by the same expression; and it is concluded that every such law similarly introduced, is *at once* to be enforced, and

<sup>98</sup> בנין אב משני כדורים.

is for ever binding, thus assigning to it the two distinctive features of the other two laws.

5.—*Juxtaposition of general and special.*<sup>99</sup> When the Bible uses first a general expression, which has fewer marks and is of wider compass, and this is followed by a special or particular one, with more marks and of a smaller compass, the definition of the latter is applied to the former in the interpretation of the law. Thus, in Levit. i. 2, it is said, "If any man of you bring an offering to the Lord from beasts, from the herd and from the flock," beasts is a general expression, and may denote different kinds of animals. But the expressions herd and flock by which it is followed, and which are special, are made to define and bind the general term. Hence it is inferred that only such beasts as belong to the herd and flock are to be offered as sacrifices.

6.—*Analogy of another passage.*<sup>100</sup> This is an extension of rules 3 and 4.

7.—*The connection of the context.*<sup>101</sup> Thus, though the general law "ye shall not steal," in Levit. xix., does not say what kind of theft is here meant, whether it refers to stealing money or human beings, yet it is explained to refer to money (comp. Exod. xxii. 16), because the whole connection treats upon money.<sup>102</sup>

There was, however, about this time, another school of interpreters, which was not content with these hermeneutical rules, and adopted canons whereby anything and everything could either be deduced from, or introduced into, the text of the Bible. These rules were afterwards collected, elaborated, and expanded by the celebrated R. Akiba b. Joseph (*circa*

<sup>99</sup> כלל ופרט.

<sup>100</sup> כיוצא בו במקום אחר.

<sup>101</sup> דבר והלכך כענינו.

<sup>102</sup> These seven rules are quoted in *Tosephta Sanhedrin*, cap. vii.; *Aboth of R. Nathan*, cap. xxxviii.; and at the end of the Introduction to the *Siphra*, comp. Frankel, *Programm zur Eröffnung des jüdisch-theologischen Seminars zu Breslau*, 1854, p. 15; and Kitto's *Cyclopædia of Biblical Literature*, s. v. HILLEL I.



a. d. 40-120), whose brilliant endowments were only equalled by his extraordinary influence. As the destruction of Jerusalem and the abolition of the sacrificial service which he had witnessed necessarily gave rise to new usages and laws, he had no difficulty in showing, by his rules of interpretation, that they might all be deduced from the Scriptures. The more conservative party, however, which was now exceedingly weakened in power and few in number, adhered to the ancient Palestinian Halacha. This for a time gave rise to two antagonistic schools, corresponding in name to the Eastern and Western branches in Christendom, and Akiba headed the Anti-Palestinian or the modern Halacha.

R. Akiba made the basis of his system of interpretation the cardinal maxim, that the style and composition of the Bible, and especially in its Halachic or legal portions of the Mosaic Code, are totally different from that of all other writings. In human productions, authors do not confine themselves to the simple vocabulary which is absolutely necessary to express their meaning, but resort to repetitions, rhetorical phrases, figures of speech, metaphors, euphemisms, &c., which as far as the understanding of the sense is concerned are superfluous, and are simply employed to round off periods for pleasing the ear, and to render the composition a production of taste and art. Not so the Bible. Here nothing is form, everything is essence. Here are no pleonasms. No sentence, no word, no syllable, no letter, nor even a Jod or tittle is redundant; but the most minute particle is an essential constituent, and enshrines a divine idea.

Hence the construction of the finite verb with the infinitive, which is of such frequent occurrence, cannot be a simple idiomatic repetition; the particles **וּ**, **נִם**, **וְ**, **אֵךְ**, have a special and profound meaning, the particle **אֵת** cannot be a mere sign of the accusative, and the expression **לֵאמֹר** saying, which is so

frequently used as in introductory formula, has a particular significance, and the very order of the words could not have been selected by the Infinitely Wise, without indicating thereby that their letters are intimately related to the letters of those words in the sentence, by which they are both preceded and followed, so that a redistribution and separation might easily be effected.

At the head of the Palestinian school, and of those who adhered to the ancient Halacha, was R. Ishmael ben Elisa, contemporary and antagonist of R. Akiba. R. Ishmael was the son of one of the last high priests, and of the family of Fabi. He maintained that the Bible, being written in human language, uses expressions in their common acceptation; that many of the repetitions and parallelism are simply designed to render the style more rhetorical and powerful, and cannot, therefore, without violating the laws of language, be adduced in support of legal deductions, or be made to conceal some recondite meaning. Accordingly he adhered to Hillel's rules of interpretation, which he expanded into thirteen, as follows:—

Rules 1—4. 1. Inference from the minor to the major; 2. Inference from the analogy of ideas in another statute; 3. From the chief law as found in one verse or in two verses; 4. General and special. These four exegetical rules, it will be seen, constitute the first five rules as laid down by Hillel, the fourth and fifth of the latter being merged by R. Ishmael into one, and as they have already been explained, we can proceed with the remaining nine canons, which require explanation.

Rule 5.—*Special and General*.<sup>108</sup> This is simply rule 4 reversed. That is, if a special subject is followed by a general one, the special is extended by the general, since it is maintained that the first term is to be explained by

the one which follows it. Thus it is said, "If a man deliver unto his neighbour an ass, ox, or a sheep, or any beast to keep" (Exod. xxii. 9). Here ass, ox, and sheep are special, and the following expression, *beast*, is general; hence the preceding special terms are extended thereby, and it is concluded that everything living, even if it is not like an ass, ox, or sheep, comes under this law.

Rule 6.—*General, Special, and General.*<sup>104</sup> That is, when the general is followed by a special, and this again by a general subject, the law is interpreted according to the marks of the special subject, since there is a doubt whether the stress lies upon the middle term, whereby the first general term is limited, or upon the last general term, which obtains a wider generality through it. Hence the middle course is taken, and the law is neither extended to the whole compass of the last expression, nor limited to the middle term, but is applied to everything which resembles it. Thus, for instance, Deut. xiv. 26 ordains that the money realised from the sale of the tithes to be taken to the temple "may be bestowed on whatsoever thy soul lusteth after [general], for oxen, or for sheep, or for wine, or for strong drink [special], and for whatsoever thy soul desireth" [general again]; it is concluded that, just as the general has two properties, viz., *fecundity*, which is the case with oxen and sheep, and *sustenance*, which is the case with wine, so the subject which is to be comprised therein must have these two properties; and as winged animals have these two qualities, the money in question may be expended upon them. It is, however, a matter of dispute whether the resemblance is to be established on the ground of two or three properties.<sup>105</sup>

Rule 7.—*A general subject which requires a special one, and a special which requires a general subject, for mutual*

<sup>104</sup> בלל פרט וכלל.

<sup>105</sup> *Erubim*, 27 b; 28 a.

*explanation.*<sup>106</sup> The difference between this rule and rules 4 and 5 is, that the former is incomplete without further explanation, whilst the latter are complete in themselves. Thus, for instance, in the law respecting the sanctification of the firstborn, it is stated in Exod. xiii. 2, "Sanctify unto me all the first-born [general], whatsoever openeth the womb" [special]; and in Deut. xv. 19, is added, "all the firstling males thou shalt sanctify" [special]; explaining the general term *first-born*, which includes both males and females, to denote males only. But as the term *male* is still insufficient, inasmuch as it simply denotes the first male, which may have been preceded by the birth of females, the phrase, "whatsoever openeth the womb" is added, thus restricting it to the first-born.<sup>107</sup>

Rule 8.—*When a special law is enacted for something which is already comprised in a general law, it shows that it is also to be applied to the whole class.*<sup>108</sup> Thus it is enacted, in Levit. vii. 20, that "the soul that eateth of peace-offerings, that pertain unto the Lord, having his uncleanness upon him, shall be cut off from his people." Now, since this is already comprised in the law, "he shall not eat of the holy things" (*Ibid.* xxii. 4), for peace-offerings are holy things, it is inferred that it is applicable to all the sacrifices which belong to the category of peace-offerings, but not to other classes of sacrifices, which are devoted to the service of the temple. This exegetical rule, however, is not applicable in case the subject thus singled out from the general law for special enactment is expressed in the positive, and the general law itself is in the negative form.<sup>109</sup>

Rule 9.—*When a subject which is included in a general*

כלל הצורך לומר ושרם הצורך לכלל <sup>106</sup>

<sup>107</sup> Berathoth 19a.

דבר שיהיה בכלל יצא מן הכלל ולמד לא ללמד עצמו יצא מלא ללמד על הכלל כולו יצא <sup>108</sup>

<sup>109</sup> Jebamoth, 7 a; Shebuoth, 7 a; Sabbath, 70 a.

*description is excepted from it for another enactment, whilst it remains in all other respects like it, it is excepted to be alleviated, but not aggravated.*<sup>110</sup> Thus, for instance, it is stated in Levit. xiii. 18, "the flesh, when there was in the skin thereof a boil, and it healeth;" and in verse 24, "or flesh, when there was in the skin thereof a burn from fire." Now from both these statements, which seem to be superfluous, inasmuch as inflammation and a burn belong to eruptions, and hence come under the law enacted for this class of complaints, it is inferred that they are only subject to the law which is expressly stated here, and not to the rigid laws which are elsewhere enacted about eruptions.

Rule 10.—*When a subject which is included in a general description is excepted from it for another enactment, whilst it is also not like it in other respects, it is excepted both to alleviate and aggravate;*<sup>111</sup> that is, its connection with the general law entirely ceases. Thus, for instance, from the special mention in Levit. xiii. 29, "if a man or woman have a plague upon the head or the beard," when we should have thought that the head and beard are comprised under the skin and flesh, and come under the law of skin diseases generally; it is inferred that they are only comprised under it in name, but not in reality, and are the subject of special law (compare *Ibid.* verses 10, 25, 30).

Rule 11.—*If a subject which is included in a general description is excepted from it for the enactment of a new and opposite law, it cannot be restored again to the general class unless the Bible itself expressly restores it.*<sup>112</sup> Thus from the statement in Levit. xiv. 18, "and he shall slay the lamb in the place where he shall kill the sin-offering and the burnt-offering, in the holy place; for as the sin-offering is

<sup>110</sup> דבר שהיה בכל ויצא למשכן מעון אחר שהוא כענינו יצא לחקל ולא להחמיר

<sup>111</sup> דבר שהיה בכל ויצא למשכן מעון אחר שלא כענינו יצא לחקל ולהחמיר

<sup>112</sup> דבר שהיה בכל ויצא לידון בדבר חדש או אחר יכול להחמיר לכלו פי שיהיהו הכתוב בפרש

the priest's, so is the trespass-offering, it is most holy;" it is inferred that the phrase, "as the sin offering, so is the trespass offering," which would otherwise be entirely superfluous, shows that the special subject, respecting which new laws had been passed (comp. Levit. xiv. 3, 3, with vii. 2-5), whereby it had been put in opposition to the general class, is again united, and put on an equality therewith.<sup>113</sup>

Rule 12.—*The sense of an indefinite statement must either be determined from its connection, or from the form and tendency of the statement itself.*<sup>114</sup> It will be seen that the former part of this rule is the same as Hillel's rule 7.

Rule 13.—*When two statements seem to contradict each other, a third statement will reconcile them.*<sup>115</sup>

A comparison of R. Ishmael's thirteen exegetical canons, with the seven rules of Hillel, will show that the former are simply an elaboration and amplification of the latter. Thus rules 3, 4, and 6 of Hillel are merged in R. Ishmael's system into one rule; whilst Hillel's rule 5 has been expanded by R. Ishmael into eight subdivisions. R. Ishmael's rule 13 is the only new canon.<sup>116</sup>

But, though the exegetical canons enunciated and defended by R. Ishmael are rational, and redound to the honour of the age in which they were propounded, still they were by no means popular. Like the mass of the religious communities in the present day, the people at large in those days were vastly more pleased with R. Akiba's rules of interpretation, which could make the sacred text utter things that tickled the imagination, supported the

<sup>113</sup> *Jebamoth*, 7 a; *Sebachim*, 49 a.

<sup>114</sup> דבר הלמד מענינו דבר הלמד מסתמו

<sup>115</sup> שני נחמדים המכודשים זה את זה עד שיבא הכתוב השלישי ויסיר ביניהם R. Ishmael's rules are given at the beginning of the *Sipara*.

<sup>116</sup> Comp. Frankel's *Monatschrift*, vol. i., p. 157, Dresden, 1852; by the same author, *Dorke Ha-Mishna*, p. 108, Leipzig, 1869; Graetz, *Geschichte der Juden*, vol. iv., pp. 60, &c., Leipzig, 1866.

extravagances of fanatics, and humour the idiosyncrasies and temperament of each individual, than with hermeneutical canons, which subjected the Bible to the same binding laws of language and grammar as are employed in the exposition of all other written documents. Hence R. Ishmael's system, which represented the literal school of exegesis, was gradually superseded by that of the allegorical school, headed by R. Akiba.

As the allegorical school also adopted other rules of interpretation, it soon became necessary to systematise them again. This task was now undertaken by R. Eliezer b. Jose, the Galilean, who flourished A. D. 120-170. This celebrated doctor, whose sayings are so frequently recorded in the Talmud, and in the Siphri, collected thirty-two rules whereby the Bible is to be interpreted, and arranged them as follows:—

**Rule 1.**—*By the superfluous use of the three particles, וְ, וּ, and הִנֵּה, the Scriptures indicate in a threefold manner that something more is included in the text than the apparent declaration would seem to imply.*" Thus, for instance, when it is said (Gen. xxi. 1), "And the Lord visited (וְהָיָה אִתָּהּ) Sarah," the apparently superfluous particle וְ, which sometimes denotes *with*, is used to indicate that *with* Sarah the Lord also visited other barren women. Thus too the second וּ, we are told, is used superfluously in the passage, "take also your herds, and also (וּ) your flocks" (Exod. xii. 32), to indicate that Pharaoh also gave to the Israelites sheep and oxen, in order to corroborate the declaration made in Exod. x. 25; whilst the seemingly redundant הִנֵּה, in 2 Kings ii. 14, "he also (הִנֵּה) had smitten the waters," indicates that more wonders were shown to Elisha at the Jordan than to Elijah, as it is declared in 2 Kings ii. 9. This rule is called *inclusion, or more meant than expressed*.

Rule 2.—*By the superfluous use of the three particles, ׀, ׀, and ׀, the Scriptures point out something which is to be excluded.* Thus, for instance, in Gen. vii. 23, “and Noah only (׀) remained,” the ׀ shows that even Noah was near death, thus indicating exclusion. In “Only (׀) the fear of God is not in this place” (Genesis xx. 11); the superfluous ׀ shows that the inhabitants were not altogether godless; whilst ׀ in “And the people stood by Moses from (׀) the morning unto the evening” (Exod. xviii. 13), indicates that it did not last all day, but only six hours. This rule is called *מיעוט, diminution, exclusion.*

Rule 3.—*If words denoting inclusion follow each other, several things are included.* Thus, in 1 Sam. xvii. 36, “thy servant slew also (׀) the lion, also (׀) the bear,” three superfluous expressions follow each other, to shew that he slew three other animals besides the two expressly mentioned in the text. This rule is called *inclusion after inclusion.*<sup>118</sup>

Rule 4.—*If words denoting exclusion follow each other, several things are excluded.* Thus, in Numb. xii. 2, “Hath the Lord indeed only spoken to Moses? hath he not also spoken to us?” the superfluous expressions, ׀ and ׀, which follow each other, denote that the Lord spoke to Aaron and Miriam before he spoke to Moses; thus not only without the law-giver *being present* to it, but *before* God spoke to him. Moreover, not only did He speak to Aaron, but also to Miriam, so that there is here a twofold exclusion. If two or more inclusive words follow each other, and do not admit of being explained as indicative of inclusion, they denote *exclusion*. For instance, if the first word includes the whole, whilst the second only includes a part, the first inclusion is modified and diminished by the second. If, on the contrary, two or more exclusive words follow each other, and do not admit of being explained as indicative of exclusion, they



denote inclusion. Thus, for instance, if the first excludes four, whilst the second only excludes two, two only remain included, so that the second exclusive expression serves to include or increase. This rule is called "*Exclusion after exclusion*;"<sup>119</sup> and the two exceptions are respectively denominated "*Inclusion after inclusion, effecting diminution*,"<sup>120</sup> and "*Exclusion after exclusion, effecting increase*."<sup>121</sup>

Rule 5.—*Expressed inference from the minor to the major.*<sup>122</sup> An example of this rule is to be found in Jerem. xii. 5, "If thou hast run with the footmen and they have wearied thee [inference], then how canst thou contend with horses?"

Rule 6.—*Implied inference from the minor to the major.*<sup>123</sup> Thus, in Psalm xv. 4, it is stated, "he sweareth to his own hurt, and changeth not;" hence how much less if he swears to his advantage.

Rule 7.—*Inference from analogy or parallels.*<sup>124</sup> Thus, for example, of Samuel it is said, that "there shall no razor come upon his head" (1 Sam. i. 11), and because the same language is used with respect to Samson, "no razor shall come upon his head" (Judges xiii. 5), it is inferred that just as Samson was a Nazarite, so also was Samuel.

Rule 8.—*Building of the father*, which has already been explained.<sup>125</sup>

Rule 9.—*Brachology*,<sup>126</sup> or the supplying of words in the text demanded by the context, since the Scriptures sometimes express themselves briefly. For instance, in 2 Sam. xiii. 39, where we have, "and she, David longed," the word *soul* is to be supplied, viz., "and she, David's soul longed;" and in 1 Chron. xvii. 5, where it is, "and I have been from tent to

119 מיעוט אחד מיעוט

אין רבוי אחד רבוי אלא למעט

120 מיעוט אחד מיעוט אלא לרבות

121 קל חומר סותר

122 קל חומר סתום

123 נורח טוח

124 בגין אב

125 דרך קצרה

tent, and from tabernacle," the word *going* and *to tabernacle* are to be supplied, viz., "I have been going from tent to tent, and from tabernacle to tabernacle."

Rule 10.—*Repetition*.<sup>127</sup> The Scriptures repeat a thing in order to indicate thereby something special. Thus in "Trust ye not in lying words, saying, The temple of the Lord, the temple of the Lord, the temple of the Lord" (Jerem. vii. 4), the last phrase is repeated three times, to indicate that though his people Israel celebrated feasts in the temple three times a year, viz., Passover, Pentecost, and Tabernacles, the Lord will not regard it, because they do not amend their ways.

Rule 11.—*The order or context is sometimes interrupted by the division into verses, and has to be restored*.<sup>128</sup> Thus, in 2 Chron. xxx. 18, 19, the division of the verses is to be disregarded, and the two verses must be read as one, viz., "Hezekiah prayed for them, saying, The good Lord pardon for the sake of every one who prepared his heart to seek God," &c. The same is the case in Isa. xxxiv. 17, xxxv. 1.

Rule 12.—*A subject often explains itself, when it imparts information on other subjects*.<sup>129</sup> For example, although we are nowhere told in the Scriptures that the voice of the serpent was heard from one end of the world to the other, yet it is presupposed in Jerem. xlvi. 22. Here, in speaking of the overthrow of Egypt, the prophet declares that "her voice shall ascend like that of the serpent," i. e., just as the voice of the serpent ascended, so shall the voice of Egypt ascend; and as the only occasion when the serpent had reason to cry is recorded in Gen. iii. 14, the statement in question teaches us that when the Holy One, blessed be he, said to the serpent, "upon thy belly shalt thou go," the ministering angels descended and cut off the feet and hands

127 דבר שחוזר שוב

סדר שבהלך 128

דבר שבא ללמד והמבוא ללמד 129

of the reptile, when its shrieks went forth from one end of the world to the other. Thus, the serpent, which gives information about the overthrow of Egypt, at the same time also teaches us something about its own fate.<sup>130</sup>

Rule 13.— *A general statement is made first, and is followed by a single remark, which serves simply to particularise the general.*<sup>131</sup> Thus the statement in Gen. i. 27, "male and female created He them," records the creation of man in general terms; whilst ii. 7, which describes the creation of Adam, and ii. 21, which speaks of the formation of Eve, are simply the particulars of i. 27, and are neither another record, nor a contradiction.

Rule 14.— *A great and incomprehensible thing is often represented by something small, to render it intelligible.*<sup>132</sup> Thus in Deut. xxxii. 2, "My doctrine shall drop as the rain," the great doctrines of revelation are compared with the less significant rain, in order to make them comprehensible to man. The same is the case in Amos iii. 8, "When the lion roareth, who doth not fear? the Lord speaketh," &c., where the lion is compared with the Deity, to give an intelligible idea of the power of God.

Rule 15.— *When two Scriptures seem to contradict each other, a third Scripture will often reconcile them.*<sup>133</sup> Thus 2 Sam. xxiv. 9 says that "there were in Israel eight hundred thousand valiant men," whilst 1 Chron. xxi. 5 states that there were "a thousand times thousand, and a hundred thousand men that drew the sword;" being three hundred thousand more than in the first passage. Now the apparent contradiction between these two passages is reconciled by a third passage, viz., 1 Chron. xxvii. 1, where it is said that "the children of Israel after their number, to wit, the chief

<sup>130</sup> Comp. *Sota*, 9b.

<sup>131</sup> כלל שאחריו מצינו ואינו אלא פרשו של ראשון

דבר גדול שנחלה בקטן להשיב האותן כדרך שהוא שומעת

שני כתיבים המכריעים זה את זה עד שיבא הכתוב השלישי ויכריע ביניהם <sup>133</sup>

fathers, and captains of thousands and hundreds, and their officers who served the king in all matters of the courses, who came in and went out, was, month by month, through all the months of the year, twenty-four thousand in each course." Since it is evident from this that the number of these servants for twelve months amounted to two hundred and eighty-eight thousand; and as the chief fathers of Israel consisted of twelve thousand, we obtain the three hundred thousand who were noted in the register of the kings, and who are therefore not mentioned in 2 Sam. xxiv. 9.

Rule 16.—*An expression used for the first time is sometimes explained by the passage in which it occurs.*<sup>184</sup> Thus, for instance, Hannah is the first who in her prayer addresses God as "Lord of hosts;" whence it is concluded that the superfluous expression *hosts* (plural) indicates that she must have argued to this effect: "Lord of the universe, thou hast created two worlds (עֲבֹאוֹת); the inhabitants of the upper world do not procreate, and those of the lower do. Now if I belong to the nether world, I ought to be fruitful, and if to the upper world, I ought to live for ever." Hence the expression in this passage is designed.

Rule 17.—*A circumstance which is not fully described in the passage in which it first occurs, is sometimes explained in another passage.*<sup>185</sup> Thus in Gen. ii. 8, where the garden of Eden is first mentioned, it is stated that there were in it all manner of fruit trees; but it is not to be gathered from this passage that there was anything else in it. From Ezek. xxviii. 13, however, where this passage is further explained, it is evident that there were also precious stones in Paradise.

Rule 18.—*A thing which is sometimes named in part, comprises the whole.*<sup>186</sup> Thus, in Exod. xxii. 30, it is for-

<sup>184</sup> דבר מיוחד במקומו

<sup>185</sup> דבר שאינו מפורש במקומו ומפורש במקום אחר

<sup>186</sup> דבר שנאמר במקצת והוא נהוג בכל

bidden to eat, the flesh of an animal which was "torn in the field;" and in Levit. xxii. 8, it is said, "that which is torn, ye shall not eat;" which includes also those animals torn in the city. The use of the expression *field*, in the first passage, is owing to the fact that beasts are far more frequently torn in it than in the city, and the Scriptures, therefore, mention the common, and not the uncommon occurrence. Hence in the expression "field," everything is comprised—city, country, forest, mountain, valley, &c.

Rule 19.—*The respective predicates of two subjects in the same passage may refer to both alike.*<sup>137</sup> Thus, "light is sown for the righteous, and gladness for the upright in heart" (Ps. xevii. 11), does not imply that the former is without gladness and the latter without light, but what is predicated of one also belongs to the other.

Rule 20.—*The predicate of a subject may not refer to it at all, but to the one next to it.*<sup>138</sup> Thus the remark, "this of Judah" (Deut. xxxiii. 7), does not refer to Judah, since it is said, further on, "And he said, Hear, Lord, the voice of Judah," but to Simeon, whom Moses hereby blesses after Reuben.

Rule 21.—*When a subject is compared with two things, it is to receive the best attribute of both.*<sup>139</sup> Thus in the passage, "the righteous shall flourish like a palm-tree, he shall grow up like a cedar in Lebanon" (Ps. xcii. 12), the fruitfulness of the one, and the strength and majesty of the other, are the points of comparison.

Rule 22.—*The first clause in parallelisms often explains the second to which it refers.*<sup>140</sup> Thus, in Prov. xxi. 14, the first hemistich, "a gift in secret pacifieth anger," signifying

דבר שנאמר בזה דודא לחבירו <sup>137</sup>

דבר שנאמר בזה ואינו ענין לו דודא ענין לחבירו <sup>138</sup>

דבר שהוקש לשתי מדות ונחה נותן לו כח דודא שבשהיתן <sup>139</sup>

דבר שהבדיל מוכיח עליו <sup>140</sup>

the anger of God, shows that the second hemistich refers to the anger of God.

Rule 23.—*The second clause in parallelisms often explains the first hemistich to which it refers.*<sup>141</sup> For example, "the voice of the Lord shaketh the wilderness, the Lord shaketh the wilderness of Kadesh" (Psalm xxix. 8). Here "*Kadesh*," though comprised in the expression "wilderness" of the first clause, is used in the second clause to heighten the strength of the first hemistich, by showing that the wilderness must have been shaken exceedingly, since even Kadesh, which is the greatest wilderness, was shaken. This is also the case in Deut. i. 16.

Rule 24.—*A subject included in the general statement is sometimes singled out from it, to convey a special lesson.*<sup>142</sup> Thus, for example, "Joshua, the son of Nun, sent out of Shittim two men to spy secretly, saying, Go view the land, and Jericho" (Josh. ii. 1). Here "*Jericho*" is apparently superfluous, since it is comprised in the general term "land." It is, however, specially mentioned to indicate that Jericho by itself was equal in power and strength to the whole country. Hence that which is singled out teaches something about itself.

Rule 25.—*A subject included in a general statement is sometimes singled out from it, to teach something special about another subject.*<sup>143</sup> Thus the command, "Ye shall take no redemption price for the life of a murderer, who is guilty of death" (Numb. xxxv. 31), seems entirely superfluous, since it is included in the declaration already made, "As he hath done, so shall it be done to him" (Levit. xxiv. 19). It is, however, mentioned especially, to be a guide for other punishments, since it is concluded from it that it is

<sup>141</sup> דבר שדחה מוכיח דבר

<sup>142</sup> דבר שדחה בכלל ויצא מן הכלל ללמד על עצמו יצא

<sup>143</sup> דבר שדחה בכלל ויצא מי הכלל ללמד על דברו

only for murderers that no redemption price is to be taken; but that satisfaction may be taken in case of one knocking out his neighbour's tooth, or his eye.

Rule 26.—*Parable, or Allegory* (פסוק). Thus when it is said in Judges ix. 8, that "The trees went forth on a time to anoint a king over them, and they said unto the olive-tree, Reign thou over us;" it does not mean the trees, but that Israel said to Othniel, son of Kenaz, Deborah, and Gideon, Reign over us. It must, however, be remarked, that the allegorical and parabolic interpretation of whole passages is restricted to the Prophets and Hagiographa; and that no more than two, or, at the outside, three expressions following each other consecutively, may primarily be explained allegorically, or figuratively, in the Pentateuch. Thus, for instance, in Exod. xxi. 19, "upon his staff," is explained "If he rise again and walk abroad, supported by his strength." Here the single word *וּפָעִי*, upon his staff, is taken figuratively in the sense of *convalescence*, strength. In the passage, "If the sun be risen upon him" (Exod. xxii. 3; [Heb. xxii. 2]), two words are taken figuratively, and explained, If it is as clear to you as the sun, or if he has peaceful intentions towards thee like this sun, which is peace in the world; namely, that he intended only to steal and not to commit murder. Whilst in Deut. xxii. 17, where "And they shall spread the cloth before the elders of the city," which is explained that the witnesses are to make their testimony as clear as the cloth, these words are taken figuratively.<sup>144</sup>

Rule 27.—*That which precedes often explains what follows.*<sup>145</sup> Thus, "And the Lord said unto Jehu, Because thou hast done well, executing that which is right in mine eyes, . . . thy children of the fourth generation shall sit on the throne of Israel" (2 Kings x. 30), is to be explained by what precedes. Because we are told in the preceding

<sup>144</sup> Comp. *Kelhuboth* 46 a.

<sup>145</sup> מִכֵּן שְׂדֵה־שֶׁן מִכֵּל בְּהִנְיָה

section that Jehu destroyed four generations of the house of Ahab, viz., Omri, Ahab, Joram, and his sons (comp. v. 13), therefore shall four generations of his house remain on the throne.

Rule 28.—*Antithetical sentences often explain each other by their parallelism.*<sup>146</sup> Thus, for instance, Isaiah xxx. 16, “But ye said, No; for we will flee upon horses; therefore shall ye flee: and ride upon rapid runners; therefore shall your pursuers run.” Here the words wherewith the Israelites have sinned are put in parallelism with the words of punishment, couched in the same language, and in similar expressions.

Rule 29.—*Explanations are sometimes obtained by reducing the letters of a word to their numerical value, and then substituting for the word another expression or phrase of equal nominal value;*<sup>147</sup> or by *permutation or interchange of the letters*. As an illustration of the first part of this rule we may quote Eliezer, Abraham’s faithful servant, who it is shown was worth a host of servants, by reducing the name to its numerical value, viz., ך 200, + ן 7, + ץ 70, + י 10, + ך 30, + ן 1 = 318, which is exactly as much as the three hundred and eighteen young men, or the host with which Abraham vanquished the allied monarchs, mentioned in Gen. xiv. 14. As an illustration of the second part of this rule, the word שֶׁשַׁח Sheshach (Jerem. xxv. 26; li. 41) is instanced. This word is explained to stand for בָּבֶל Babel, by taking the letters of the alphabet in their inverse order, א, the first letter, occupying the place of ת, the last letter of the alphabet; ב, the second letter, that of ש, the last but one; ג that of ך; ד that of ן; ה that of ץ; and so on. According to the same canon, לֵב קָמִי, the heart of those who rise up against me, is made to stand for בְּשָׂרֵי, the Chaldeans (Jerem. li. 1). This principle of commutation is called *Atbash* (אֶתְבַּשׁ), from the first two

<sup>146</sup> מִנְּיָן שְׂדֵדֶשֶׁן מִנְּיָן בְּהִנָּה

<sup>147</sup> מִנְּיָן שְׂדֵדֶשֶׁן מִנְּיָן בְּהִנָּה



specimen pairs of letters which indicate the interchange. The commutation is also effected by bending the alphabet exactly in the middle, and by putting one half of it over the other. By alternately changing the first letter, or the first two letters, at the beginning of the second line, twenty-two commutations or anagrammatic alphabets may be made.<sup>148</sup>

Rule 30.—*A word is either divided into several words, wherein the letters are either transposed or not, or into letters, and each letter is taken as the initial, or the abbreviation, of a word.*<sup>149</sup> As an illustration of the first part of this canon, אברהם is instanced, which the Bible itself divides into three separate words, אב־המון־גִּים, *father of many nations* (Gen. xvii. 5), and כרמל, which is divided into כר and מל, the letters in כר being transposed into רך, thus yielding *soft and crushable*. An illustration of the second part of this rule may be seen in נמרצת, *vehement* (1 Kings ii. 8), every letter of which is taken as the initial of a separate word, viz., נ = נואף, *adulterer*, מ = מואבי, *Moabite*, ר = רוצח, *murderer*, צ = צור, *apostate*, and ת = תועבה, *abhorred*.<sup>150</sup>

Rule 31.—*Words and sentences are sometimes transposed.*<sup>151</sup> Thus, in 1 Sam. iii. 3, "And ere the lamp of God went out, and Samuel was lying in the temple of the Lord," the words בְּהֵיכַל יְהוָה, *in the temple of the Lord*, which are placed later in the sentence, evidently belong to וְכָבֵד, viz., "and ere the lamp of God went out in the temple of the Lord," since no one was allowed to sit down in the temple, except the kings of the house of David, much less to *lie down*. The same is the case in Ps. xxxiv., where verse 18 must be taken up to verse 16.<sup>152</sup>

Rule 32.—*Whole sections are sometimes transposed.*<sup>153</sup>

<sup>148</sup> Comp. *Nedarim*, 32 a; *Sanhedrin*, 22 a,

מִנֵּין שְׁדוּשֵׁין נוֹשְׁרִיקִין בַּהֲנוּהָ

<sup>150</sup> Comp. *Sabbath*, 105 a.

<sup>151</sup> מוקדם שהוא מאוחר בענין

<sup>152</sup> Comp. *Kiddushin*, 78 b; *Baba Kama*, 106.

<sup>153</sup> מוקדם מאוחר שהוא בפרשיות

Thus, for instance, the words "And he said unto him, Take me an heifer of three years old," &c. (Gen. xv. 9, &c.), ought properly to precede chapter xiv., inasmuch as it is anterior in point of time. This reversed order is owing to the fact that the scriptures, for some recondite reason, put certain events which occurred earlier in point of time after later occurrences.<sup>154</sup>

In addition to these thirty-two rules, the following laws of interpretation are to be mentioned.

i.—*Deduction from juxtaposition.* That is, when two enactments immediately follow each other, it is inferred that they are similar in consequences. Thus it is said in Exod. xxii. 18, 19, "Thou shalt not suffer a witch to live. Whosoever lieth with a beast shall surely be put to death;" whence it is inferred that these two statutes are placed close to each other to indicate the manner of death a witch is to suffer, which the scriptures nowhere define. Now as he who cohabits with an animal is, according to the *Halach*, based upon Levit. xx., to be stoned to death, it is concluded that a witch is to die in the same manner.

ii.—*Deduction from repetitions.* All repetitions of words, as well as constructions of the finite verb with the infinite, have a peculiar signification, and must be explained accordingly.

<sup>154</sup> Comp. *Berachoth*, 7 b, with *Pessachim*, 6 b.

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NOTE.—The Council regret that they are unable to publish the whole of this Paper, no more M.S. having been received from the Author.

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THE FIRST GERMAN BIBLE.

(HENR. EGGESTEYN.)


STRASBURG, 1486.

**D**ie wortt lamuels des küniges. Die gesicht  
nisset der in lernet sein mütter. **O** ein lieber.  
Was ist es lieber meins leibs: was ist es o  
lieber meiner derkannten was ist es. **N**icht gib den  
güt den welch: vnd dein enthabung zuertilge die  
künig. **O** lamuel nichten weist geben den wein dē  
künigen: wann wo die trunkenheit ist do ist kein  
beinligkeit. Das sy villicht nichten trincken vnd  
vergessen der vntil: vnd lassent die sache d' sün d' ar-  
men. **E**hebt lautertranck dē wynnenden: vnd wein  
die do sind bitters gemüß. Das sy trinckē vñ ver-  
gessen irs gebrechen: vnd gedenden fürbas mit des  
schmertze. **T**hu aniff dei mund dē stummē: vñ in dē  
sache aller der sün die do übergent. **T**hu auff dein  
mund: vnderseid daz do ist recht vñ vntil den ge-  
brechigē vñ dē armen. **A**leph. Wer vintet daz stark  
weib. **V**ñ dylon ist verr vō dē iünsten ende. **H**ech.  
Dasbertz irs manns versach sy an sy: vñ sy bedarf  
mit d' reube. **Q**imel. **S**y gibt im d' güt vñ mit das  
öbel: alle die tag irs lebens. **A**leph. **S**y sücht die  
woll vñ dē flachē: vnd hat gewerckt mit dē rad ir  
hand. **H**e sy ist gemacht als ei schif d' kaufmanns  
tragen ir brot vō verr. **V**an. **V**ñ sy stund anff vō  
der nacht: vñ tellt dē raub iren ingesinde: vñ disen  
iren diernen. **J**ai. **S**y merckt dē anker vñ kanft in  
vñ plant den weingarte von dem wücher ir hande.  
**H**ech. **S**y begürt ir landē mit stark: vñ kreftigt  
iren arm. **T**hech. **S**y bekant vñ sach d' ir geschaltte  
was güt: ir liebman wirt mit verlescht in d' nacht.  
**L**och. **S**y legt ir hant zu starke dingē: vñ ir fing

# THE FIRST GERMAN BIBLE.

(HENR. EGESTEVN.)

STRASBURG, 1486.

——

**W**ann do ihesus sach die scharen er steig an den berg: vnd do er was gelessen sein iungern gemacht sich zu ihm: vnd er that auff seine münd vnd lert sy sagen. Selig seint die armē mit dem grist: wann dz reich der himel ist ir. Selig seint die trübsen: wann sy beitzent die erde. Selig seint die do weinent: wann sy werden getröst. Selig seint die do hungert vnd dürst zerecht: wann sy werden gesätt. Selig seint die barmhertigen wann sy begreifent der barm. Selig seint die reinen herten: wann sy gesehent gott. Selig seint die gedulichen wann sy werden gekesset die sün gotz. Selig seint die das durcchten leident vmb das recht: wann dy reich d himel ist ir. Ir werd selig so rich die leut flüchent vnd rich iagnt vn alles vbel wider euch. Iagent liegent vmb mich. Ir wird rich: wann eiuwer lon ist mickel in den himeln. Wann alzeit iagent sy die weysagen die vor rich wann. Ir seyt ein saltz der erden. Vnd ob das saltz wirt verüppigt in dem es wirt gesaltzen. Er veracht nit von selbin: nür daz er werd außgewoschen: vn werd vertreten von den leuten. Ir seyt ein liecht der welt. Die stat mag nit sein verborgen gesetzt auff dem berge: noch sy entzündet nit das liechtmaß vnd setzent es vnder das maß wann auff das kerzstiel: das es leucht allen den die do seint in dem hause. Also leucht eiuwer liecht vor den leuten das sy gesehe eiuwere gute werck: vn wannmöglich en eiuern vatter der in den himeln ist. Nichts welt waren das ich kam zu entbinden die re od die weys







THE FIRST GERMAN BIBLE.

(HENR. EGGESTEYN.)

STRASBURG, 1486.

**D**ie wortt lamuels des küniges. Die gesicht  
milt der in lernet sein mütter. **O**ein lieber.  
Was ist es lieber meins laibs: was ist es o  
lieber meiner derkannten way ist es. **N**icht gib dem  
güt den welch ründ dein enbabung: zuertilge die  
künig. **O** lamuel nichten weilt geben den wein dē  
künigen: wamp wo die trunkenheit ist do ist kein  
königkheyt. Das sy villiche nichten trincken vnd  
vergessen der vrsak: vnd lassent die sakh d' sün d' ar-  
men. **H**ebt lautertranch dē wippenenden: vnd wein  
die do sind bitters gemüß. Das sy trinckē vñ ver-  
gessen irs gebrechen: vnd gedennen fürbas mit des  
schmertze. **T**hu aniff dei mund dē stummē: vñ in dē  
sachz aller der sün die do übergent. **T**hu auff dein  
mund: vnderscheid daz do ist recht vñ vrsak den ge-  
brechliche vñ dē armen. **A**leph. **W**er vindt daz stark  
weib. **V**ñ dylon ist verr vñ dē iunsten ende. **D**och.  
Dasbertz irs manns versach sy an sy: vñ sy bodatt  
mit d' reibe. **Q**imel. **S**y gibt im d' güt vñ mit das  
übel: alle die tag irs lebens. **D**och. **S**y sacht die  
woll vñ dē flachz: vnd hat gewerckt mit dē rad ir  
hand. **H**er sy ist gemacht als ei schif d' kaufmanns  
tragent ir brot vñ verr. **V**an. **V**ñ sy stünd aniff vñ  
der nacht: vñ tellt dē raub iren ingesinde: vñ disen  
iren diernen. **J**ai. **S**y mercht dē archer vñ kanft in  
vñ plant den weingartē von dem wücher ir hande.  
**D**och. **S**y begürt ir landē mit stark: vñ krefftigt  
iren arm. **D**och. **S**y bekant vñ sakh d' ir geschaltē  
was güt: ir liebmañ wirt mit verlescht in d' nacht.  
**L**och. **S**y legt ir hant zu stardē dingē: vñ ir fing

# THE FIRST GERMAN BIBLE.

(HENR. EGESTEYN.)

STRASBURG, 1486.

W
ann do ihesus sach die scharen er steig an den berg: vnd do er was geessen sein iungern gemachtten sich zu ihm: vnd er that auff seine mund vnd leit sy sagent. Selig seint die armē mit dem grist: wann dz reich der himel ist ir. Selig seint die senkten: wann sy bekent die erde. Selig seint die do weinent: wann sy werdent getröst. Selig seint die do hungert vnd dürst zerecht: wann sy werden gesatt. Selig seint die barmhertigen wann sy begreifft derbernd. Selig seint die reines herten: wann sy gesehent gott. Selig seint die gütlichen wann sy werdent gepfiffen die sün gotz. Selig seint die das durchten leidēt vmb das recht: wann dz reich d himel ist ir. Ir werd selig so rich die leut flüchē. vnd rich iagēt vñ alles vbel wider euch. sagent liegent vmb mich. Freuwel euch vnd der höchet rich: wann eiuwer lon ist miedel in den himeln. Wann alshut iagēt sy die weyslagen die vor rich wann. Ir seyt ein saltz der erden. Vnd ob das saltz mit verüppigt in dein es wirt gesaltzen. Es verfalet nit von dein: nür dz er werd außgeworffen: vñ werd vntreten von den leuten. Ir seyt ein liecht der welt. Die stat mag nit sein verborgen gesetzt auff den berge: noch sy entzündet nit das heubtuß. vnd setzent es vnder dz maß wann auff das berghal: das es leucht allen den die do seint in dem hant. Also leucht eiuwer liecht vor den leuten das sy gesehe eiuwere güte werck: vñ wunniglich en eiuern vatter der in den himeln ist. Nichts welt wenen das ich kam zu entbindē die er od die weys





THE FIFTH GERMAN BIBLE.

(SENSENSCHMIDT & FRISNER.)

NUREMBERG, 1470-73.

XXX.

**O** Je wort samuelis des küniges. die  
gesicht mit der yn leret sin mütter. .  
Min lieber was ist es. was ist es lie  
ber mins libe. was ist es o lieber minner ges  
lubb. Mit gib din güt den wyben. vnnnd din  
richtum zeuertilgen die künig. Mit solt o la  
muel nicht wellest geben den wim den künis  
gen. wann wo die trunckenheyte ist da ist  
kein heymlichkeit. das sy villicht nicht trun  
cken vnd vergessen d vrteyl. vñ verwandlet  
die säch der sün des armen Gebt luttertäck  
den vommene. vnd wim die do sind bitters  
gemültz. das sie trincken vñ vergessen irs ge  
bresten vnd gedeneken fürbas mit dē schmer  
tzen. Thū vff din mund dem stummen. vnd  
den sachen aller der sün die do durch gangen  
Thū vff dinen mund. Erkenn das do ist res  
cht vnd rich den gebrestigen vnd den aumen  
Kleph. Wer vindet das starck wyb von ver  
ren. vñ von den löstten enden ist irlon. Beth  
das hertze izs mans hoffet in sie. vnnnd sy bes  
darff mit der reube. Gmel. . Sie gibt in das  
güt vñ mit das übel. alle die tag ires lebens  
Deleth. Sie bat gesücket die woll vñnd den  
flachb. vnd bat gewercket mit dem rat ires  
hente. He. Sie ist worden als ein schiff des  
kaussmans tragant iz brot von reure. Nau

THE FIFTH GERMAN BIBLE.

(SEBENSCHMIDT & FRISNER.)

NUREMBERG, 1470-73.

·v·

**U**nd do iesus sach die scharen · do  
 geng er uff einen berg · vnd da er  
 was geessen sin iungern gemacht  
 sich zu ym · vnd er tat uff sinē mund vñ leret  
 sie sagen · Sālig sind die armen in dē geyst  
 wann das rych der hymel ist ir · Sālig sind  
 die senfftē wann sie sind werden besitzē die  
 erde · Sālig sind die da klagen · wann sy wer  
 den getröst · Sālig sind die da hungert vnd  
 dürst die gerechtigkeit wann sy werden ge  
 sat · Sālig sind die barmhertzigē · Wann  
 sie eruolgen die barmhertzigkeit Sālig sind  
 die reynes hertzen wann sy werden got sehē ·  
 Sālig sind die fridfamen · wann sie werden  
 geheysen die sun gottes Sālig sind die da  
 durchachtung lyden vmb die gerechtigkeit ·  
 wann das rich der hymel ist ir · Ir werd sā  
 lig so ouch die die lüt fluchen · vnd ouch durch  
 achtent vnd alles übel wider ouch sagen lie  
 gent vmb mich freuwent ouch vnd frolock  
 ent · wann iwer lon ist grob in den hymel  
 Wann also haben sy durchachtet die wyssas  
 gen die vor ouch waren · Ir sind als ein saltz  
 der erden · vnd ob das saltz verschwindet in  
 dem es wirt gefaltzen · so ist es furo zu nich  
 te nütz nur das er werd usgeworffen · vnd  
 werd vertretten von den menschen · Ir sind







THE SEVENTH GERMAN BIBLE.

(ANTONIUS BORG.)

AUGSBURG, 1477.

**Das .xxxi. capitel**

**O** Je wort samuels des künigs. Die  
gesche mit der in letet sein mäter.  
Mein lieber was ist es. was ist es  
lieber meins leibs. was ist es o. lieber meiner  
gelüb. Nit gib dein güt den weiten / vñ dem  
reichtumb züwertilgen die künig. Nit solt o  
samuel nicht wöllest geben den wein den kün-  
ig en. wam wo die trunckenheyt ist do ist  
kein heymlikeyt. Das sy vñleucht nicht trinck  
en vñd vergessen die vñteil / vñd verwand-  
lent die sach der sün des armen. Gebt lautter  
tranch den weinenden. vñ wein die do sind  
bitters gemütz. Das sy trincken vñd verges-  
sen ics gebretem vñd gedencken fürbas nit  
des schmerzzen. **Uñt** auff dein mund dem stü-  
men vñd den sachen aller o sün die do durch  
gangen. **Uñt** auff deinen mund. Erken das  
do ist recht vñd rich den gebreftigen vñd  
den acmen. **Kleph.** Wer vñdet das starck  
weib von vñren vñd von den letzten ende ist  
it lon Beth. Das hertze ics mams hoffet in  
sy vñd bedarf nit der reube Gmel. Sy gibe  
im das güt vñd nicht das übel. alle die tage  
ires lebēs **Deleth.** Sy hat gesüchet die woll  
vñd den flach / vñd hat gewercket mit dem

¶ v.

**U**nd da ihesus sach die scharen·da  
 gieng er auff einen berg·vnd da er  
 was gesessen·sein iungern genach  
 ten sich zu im·vnd er tât auff seinē mund  
 vnd leret sy sagent. Sâlig sind die armē  
 mit dem geist·wan das reich der hymel  
 ist ir Sâlig sind die senfften·wan sy wer  
 den besitzen die erde. Sâlig sind die to kla  
 gen·wan sy werdent getröst. Sâlig sine  
 die da hungert vnd durst die gerechtig  
 kait wan sy werden gesatt. Sâlig seindt  
 die barmhertzigē · Wann sy eruelgen  
 die barmhertzigkejt. Sâlig seynd die  
 reynen hertzen wan sy werden gott sehen.  
 Sâlig sind die fridsamen wan sy wetten  
 gehapffen die sün gotes. Sâlig sind die to  
 durchâchtung leyten vmb die gerechtig  
 keit wan dz reich der hymel ist ir. Ir wort  
 sâlig so euch die leut flüchent·vnd euch  
 durchâchtend vnd alles übel wider euch  
 sagent·liegent vmb mich. Freuwer euch  
 vnd frolockend·wan eurer lon ist mîchel  
 in den hymeln. Wan also haben sy durch  
 âchtet die weyßlagen die vor euch waren

THE SEVENTH GERMAN BIBLE.

(ANTONIUS SORG.)

AUGSBURG, 1477.

**Das .xxxi. capitel**

**D**u wort samuels des künigs. Die  
gesichte mit der in lezet sein miter.  
Mein lieber was ist es. was ist es  
lieber meins leibs. was ist es o. lieber meiner  
gesüh. Du gib dein güt den weiten. vñ dein  
reichthumb zuuertilgen die künig. Du solt o  
samuel nicht wöllest geben den wein den kün-  
igen. wann wo die trunckenheyt ist do ist  
kein heymlikeyt. Das sy villeicht nicht trunck  
en vñd vergeffen die vtheils vñd verwand-  
lent die sache der sün des armen. Gebt lautter  
tranc den weinenden. vñ wein die do sind  
bitters gemüt. Das sy truncken vñd verges-  
sen ics gebrechen vñd gedencken fürbas nie  
des schmerzzen. Thü auff dein mund dem stü-  
men vñd den sachen aller o sün die do durch  
gangen. Thü auff deinen mund. Erken das  
do ist recht vñd rich den gebrehtigen vñd  
den armen. Aleph. Wer vñdet das starck  
weib von vorten vñd von den lesten ende ist  
ic lon Beeth. Das hertze ics manns hoffet in  
sy vñd bedarf nit der reube Gimet. Sy gebt  
im das güt vñd nicht das übel. alle die tage  
ires lebens Deleth. Sy hat gesüchet die woll  
vñd den flach. vñd hat gewercket mit dem



THE SEVENTH GERMAN BIBLE.

(ANTONIUS BORG.)

AUGSBURG, 1477.

**Das .xxxi. capitel**

**O** Je wort samuels des künigs. die  
gesche mit der in leet sein mäter.  
Mein lieber was ist es. was ist es  
lieber meins leibs. was ist es o-lieber meiner  
gelüb. Nit gib dem güt den weiten / vñ dem  
reichtumb zuwertilgen die künig. Nit solt o  
samuel nicht wöllest geben den wein den kün-  
nig en. wann wo die trunckenheyt ist do ist  
kein heymlikeyt. das sy villeicht nicht trinck-  
en vñ vergessen die vrtail / vñ verwand-  
lent die sache der sün des armen. Gebt lautter  
trank den weinenden. vñ wein die do sind  
bitters gemütz. das sy trincken vñ verges-  
sen ics gebretem vñ gedennen fürbas nit  
des schmerzen. **Uhl** auff dein mund dem stü-  
men vñ den sachen aller o sün die do durch  
gangen. **Uhl** auff deinen mund. Erken das  
do ist recht vñ dich den gebrehtigen vñ  
den armen. **Kleph.** Wer vinder das starck  
weib von vorten vñ von den letzten ende ist  
it lon Beth. Das hertze ics mams hofet in  
sy vñ bedarf nit der reube Gmel. Sy gibe  
im das güt vñ nicht das übel. alle die tage  
ires lebēs **Deleth.** Sy hat gesüchet die woll  
vñ den flach / vñ hat gewercket mit dem

THE SEVENTH GERMAN BIBLE.

(ANTONIUS SORA.)

AUGSBURG, 1477.

Das. 8. Capitel.

**U**nd da Ihesus sach die scharen da  
ging er auff einen berg. vnd da er  
was gefessen. sein iunger gemachtē  
sich zu im. vnd er tet auff seinen münd. vnd  
leret sy sagene. Sālig sind die armē mit dē  
geyst. wann das reich der hymel ist ir. Sālig  
sind die senfftē. wan sy werdē besitzē die er-  
de. Sālig sind die do klagē. wann sy we-  
ren getrost. Sālig sind die da hungert. vñ  
dürst die gerechtigkeit: wann sy werden ge-  
satt. Sālig sind die barmhertzigē. wann sy  
eruołgē die barmhertzigkeit. Sālig sind die  
reynes hertzen. wann sy werdē got sehen. sā-  
lig sind die frideamen. wann sy werden ge-  
hryssen die sūn gots. Sālig sind die do dur-  
chächtūg leyden vmb die gerechtigkeit. wā  
das reich der hymel ist ir. Ir werdē sālig. so  
euch die heilē fluchē. vnd euch durchächtend  
vnd alles sitel wider euch sagene. liegē vmb  
mich. Ir sit wēt euch. vnd sclockend. wā  
euch lon ist michel in den hymeln. Wann al-  
so haben sy durchachtet die weyffagē die vor  
euch waren. Ir seit ein saltz der erden. vñ ob  
das saltz verschwindet in dem es wiet gesalt





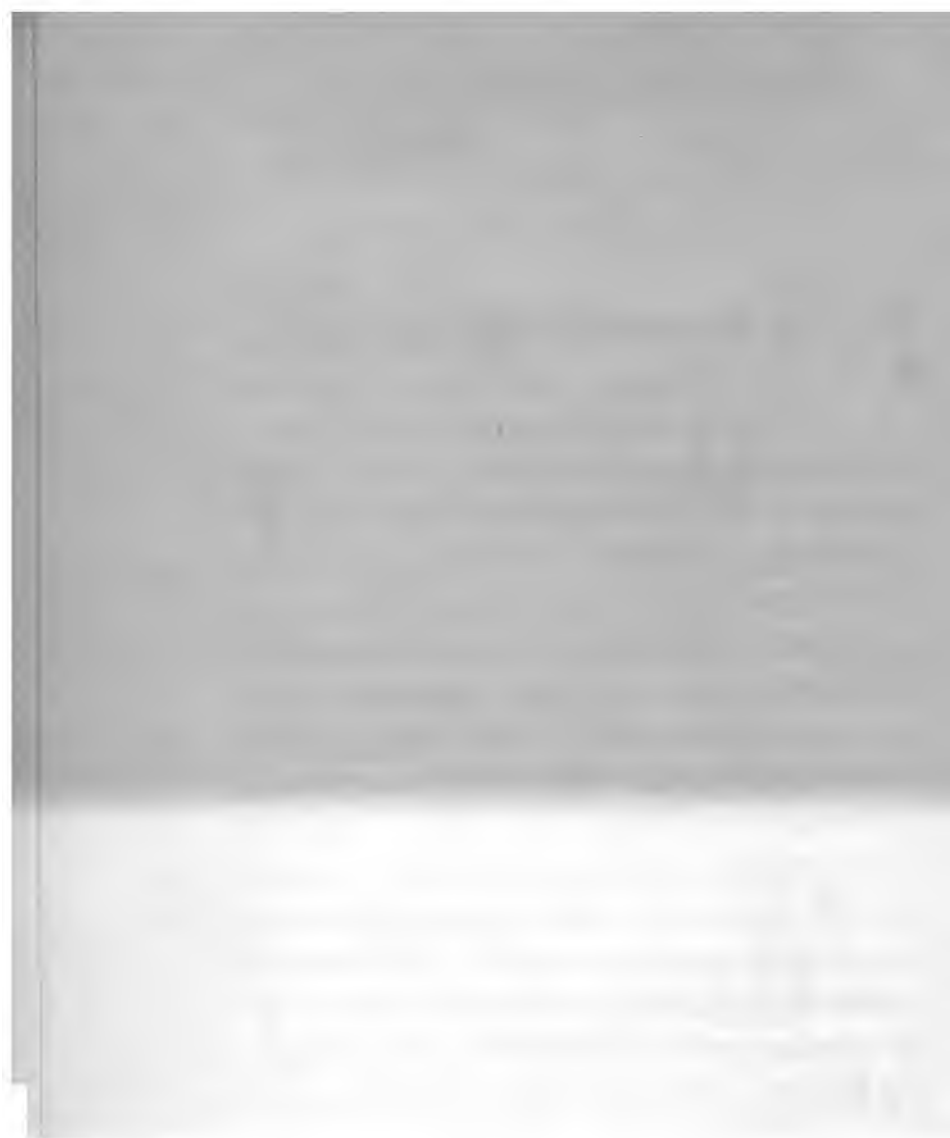


THE EIGHTH GERMAN BIBLE,  
AUGSBURG, ANTHONY BORG,  
1480.

PROVERBS XXI 1-10

**D**ie wort samuelis des künigs  
Die gesicht mit den in leret sein  
müter. **¶** Ist ein lieber was ist es  
was ist es lieber meines leibs. w3 ist es  
o lieber meiner gelüb. **¶** Ist gib dein güte  
den weissen vnd dein reichthumb zewer  
eilgen die künig. **¶** Mit solt o samuel mit  
wöllest geben den weyne den künigen.  
wann wo die trunckenheite ist do ist  
kein heymlikeyt. das sy villeicht nicht  
trinken vnd vergessen der vrteyl vnd  
verwandlent die sach d sün des armen  
**¶** Gebt lauter tranck den weinende. vnd  
wein die do seind bitters gemüts. das  
sy trinken vnd vergessen ires gebre  
sten vnd gedenden fürbas nicht des  
schmerzen. **¶** Hü auff dein mund dem  
stummen vnd den sachen aller der sün  
die do durchgangen. **¶** Hü auff deinen  
mund. erkenn das do ist recht vnd rich  
den gebresigen vnd den armen. **¶** leph  
Wer vündet das stark weib vñ verzei  
vnd von den letzten enden ist jr lone.

**U**nd do ihesus sach die scharen  
do gieng er auff einen hohen  
berg: vnd do er was gesessen.  
sein janger genachten sich zu im: vnd  
er thet auff seinen mund vnd leret sy  
sagent Selig seind die armen mit dem  
geyst: wan das reich d himel ist ir. Sa  
lig seynd die senfften: wann sy werden  
besitzen die erde. Selig seind die do kla  
gen wan sy werde getröst. Selig seid  
die do hungert vnd dürst die gerech  
tigkeit: wann sy werden gesatt. Selig  
seind die barmhertzigten: wan sy eruol  
gen die barmhertzigkeyt. Selig seynd  
die reines hertzen: wan sy werden got  
sehen. Selig seind die frid samen: wan  
sy werden geheysen die sün gottes Sa  
lig seind die do durchächte leyden um  
die gerechtigkeit: wan das reich der hi  
mel ist ir. Iet wert salig so euch die leu/  
te flüchent vñ euch durchächten: vnd  
alles das übel wider euch sagen liegen  
umb nuch. Iet reuet euch vñ frolockent:





**Daz. XXXI. Capitel. my**  
Salomons muter ine leret. Das er sein gut nit  
verzeren solt mit vnnützen weybern. Vnd was  
ein frums weyb sey.



**De wort samuelis**  
Des künigs. die gesiht. mit der in leret  
sein muter. Mein lieber. woz ist es. woz  
ist es. lieber meins leibs. was ist es. o lieber mei  
ner gelibd. Nit gib dem gut den weyb en. vnd  
dein reychtumb zeuertilgen dy künig. Nit solt  
o samuel. nicht wöllest geben den weyn. den kün  
nigen. wann wo die trunckenheyt ist. do ist kein  
heymlichkeyt. Daz sie villeicht nicht trincken. vnd  
vergessen der vrteyl. vnd veruandeln die sachen  
der sün des armen. Gebt lauter trach de weyn  
nenden. vnd weyn die do sind bitters gemüts  
das sie trincken vnd vergessen irs gebrechen. vñ  
gedecken fürbas nit des schinertzen. Thu auf  
deinen mund dem stimmen. vnd den sachen als  
ler sün. die do durchgeen. Thu auf deine müd.  
Erkenn das do ist recht vnd richt den gebrechi  
gen. vnd de armé. Aleph. Wer vindet dz starck  
weyb vñ verren vñ vñ de letzten ende ist ir lou

**D**as. V. Capitel. wie chri-  
stus dy acht seligkeyt erzelet. Vnd darnach vil  
schöner lere. gepot vnd verbot telt. als von der  
gleychfner gerechtigkeit. vñ rñden. zom opf-  
ferung. ecbrauch. von abschneydung ergerlicher  
gheder. vom ayd. von gedult. vñ liebhabung der  
vñd.

**W** Da ihesus sah die  
scharen. da gieng er auff einen berg.  
vñ da er wz gefessen. sein iungern ges-  
mahenten sich zu im. vñ er telt auff seine mund.  
vñ leret sie. sagend Selig sind dy armen in dem  
geyst. wann dz reich d hymel ist ir. Selig sind dy  
senffintigē. wann sy werdē besitzē dy erde. Sel-  
lig sind dy do klagen. wann sie werden getröstet  
Selig sind die da hñgert vñ dñrst dy gerechtig-  
keit. wann sy werdē gesatet. Selig sind dy barm-  
hertzigē. Wann sie eruolgen die barmhertzig-  
keit. Selig sind dy reynes hertze. wann sy werdē  
got sehen. Selig sind dy fridsamen. wann sy wer-  
den geschayssen die sñn gots. Selig sind die do  
durchachtung leydē vmb dy gerechtigkeit. wann  
dz reich der hymel ist ir. Ir werdt selig. so euch

1. The first part of the document is a list of names and titles, including the names of the authors and the titles of the works. This list is organized in a table format with two columns: the first column contains the names of the authors, and the second column contains the titles of the works. The names are listed in alphabetical order, and the titles are listed in the order in which they appear in the document.





## Das xxxi. capitel

Wie salomons mütter sine leret. dz  
er sein güt nit verzeren solt mit vñ  
nützen weibern Vnd wj ein strums  
weyb sey

**D**ie wort lamu  
elis, des künigs. die gesiße.  
mit der in leret sein mäter.  
Mein lieber. was ist es. was ist es.  
lieber meins liebs. wj ist es. o lieber  
meiner gelubd Tut gib dein güt vñ  
weyden. vñ dein reichthum zenertrif  
gen die künig. Tut solt o samuel  
nicht wöllest gebē den wein den kün  
nigen. wañ wo die trunckenheit ist  
do ist kein heymlichkeit. das sie vil  
leicht nicht trincken. vñ vergessen  
der vteyl. vñ verwandeln die sache  
der sün des armē Gebt lauterträck  
vñ weynenden. vñ wein die do sind  
biters gemüts dz sie trincken vnd  
vergessen irs gebresten. vnd gedon  
cken fürbas nit des schmerze. Thū  
auff deinen müd vñ stummen. vnd  
den sache aller sün die do durchgeen  
Thū auff deine müd. Erken dz do  
ist recht vñ rich den gebrestigē. vñ  
vñ armen. Aleph. Wer vndet das  
starck weiß vñ verren vnd von den

## Das. v. capitel

Wie christus die achte seligkete erzelt. Vñ darnach vil schöner lre. gebot vñ verbot telt als vñ 8 gleichner gerechtigkeit. von rößen. zorn. opfferung. ebruch. von abschneydung ergetlicher ghyder. vñ eyd. vñ gebult. vñ liebhabung der veynd

**U**nd da ihesus saß die scharen. da gyeng er auff einen berg. vñ da er was geseßen. sein iungern genahenten sich zum im. vñ er telt auff seynen mündt. vñ leret sy. sagend. Selig sind die armen in des geyst. wān das reich der himel ist ir. Selig sind dy senkmitrige. wān sy werde besitzē die erde. Selig sind die do klagen. wān sy werden getröstet. Selig sind dy da hungert vñ dürst die gerechtigkeit. wān sie werden gesatet. Selig sind die barmhertigen wān sie envolgē die barmhertigkeit. Selig sind die reynes hertze. wān sye werden gott sehen. Selig sind die tridsamen. wān sie werde geheissen die sūn gods. Selig sind die do





THE FOURTEENTH GERMAN  
BIBLE.

(SILV. OTMAR)

AUGSBURG, 1518.

## Das. XXXI. Capitel

**W**ie Salomons mütter in leret das  
er sein güt nit verzeren solte mit vnnü-  
tzen weybern / Vnd was ain stammes  
weib sey.

**D**u wost Lammelis des künigs  
die gesicht / mit der in leret sein  
müter. Mein lieber / was ist es  
was ist es / lieber meines labes / was ist  
es / o lieber meiner gelübdt. Nit gib dein  
güt den weyben / vnnnd dein reichthumb  
schuertilgen die künig. Nit solt o Lammel  
nit wöllest geben den wein den künig  
Wann wo die trunckenheit ist / da ist  
kein haimlichkeit / das sy villeicht nicht  
trincken vnd vergessen der vitail / vnnnd  
verwandeln die sach in sin des armen.  
Geht lautter tranck den wainenben /  
vnnnd wein die da sind bitters gemä-  
tes / das sy trincken vnnnd vergessen irs  
gebaestes / vnd gedencken fürbaß mit  
des schmerzen. Thū auff deinen rumb  
den sturzen / vnd den sachen aller sin  
die da durchgeen. Thū auff dein rumb

THE FOURTEENTH GERMAN  
BIBLE.

(SILV. OTMAR.)

AUGSBURG. 1518

## Das V Capitel

**W**ie christus die acht sältigkeit erzele  
Vnd darnach vil schöner leet. gebot vñ  
verbott thet / als von der gleichfuer ge-  
rechtigkeit / von roten. zorn. opfferung /  
eebend / von abschneydung ergerlicher  
gelider / vom ayd / von gedult / vnd lieb  
habung der feind.

**U**nd do iesus sahe die scharen /  
do gieng er auff ainen berg. vñ  
do er was geseffen. sein junger  
genaheten sich zu jm / vñ er thet auf sei-  
nen mund vnd leeret sy sagene. Sältig  
seind die armen in dem gaist / wann das  
reych der hymmel ist ir. Sältig seind die  
senssmütigen / wann sy werden besigen  
die erd. Sältig seind die da klagen. wann  
sy werden getröstet. Sältig seind die da  
hungert vnd durst die gerechtikeit. wann  
sy werde erfattet. Sältig seind die barm-  
hertigen / wann sy enolgen die barm-  
hertigkeit. Sältig seind die reynes her-  
zen / wann sy werden gott sehen. Säl-  
tig seind die stidsamen / wann sy werden



INDEX TO PAPERS  
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## PART I.

### INDEX OF SUBJECTS.

#### A

- Adaptability** to altered circumstances ; an attribute of Life—Inman, 1859–60, p. 63.
- Adulteration of Food**—Evans and Samuelson. 1855–6, p. 117.
- Aerolite** (Corrientes)—Dr. Dickinson. 1852–3, p. 207.
- Agassiz' views of Darwin's theory**—Collingwood. 1860–1, p. 81.
- Agricultural Statistics**—Sutton. 1846–7, p. 95.
- Alabama ; Fossils from.** 1844, p. 75.
- Albert ; H. R. H. Prince, on the death of.** 1861–2, p. 63.
- Alchemy**—Davies. 1867–8, p. 177.
- Ancient Art and Education**—Howson. 1850–1, p. 229.
- Andorra ; A visit to the Republic of**—Whittle. 1870–1, p. 89.
- Aneroid Barometer ; Observations on**—Hartnup. 1850–51, p. 235.
- Anemometer, An, capable of measuring the Speed of Air in heated Flues,**  
&c.—Fletcher. 1869–70, p. 31.
- Animal and Vegetable Life**—Inman. 1849–50, p. 113.
- Animal, Chemistry of the, and of the Plant**—Davies. 1869–70, p. 126.
- Anthropology of the *Filatahs***—Hutchinson. 1854–5, p. 44.
- Antient Manuscripts**—Yates. 1851–2, p. 59.
- Antiquities found at Hoylake**—Dr. Hume. 1845–6, p. 53, with Plates and woodcuts.
- Antiquity of certain Christian and other Names**—Inman. 1865–6, p. 118.
- Arbitration ; International**—Inne. 1857–8, p. 119.
- Architecture, Gothic**—A. Rimmer. 1847–8, p. 52.
- Architectural Criticism**—Horner. 1851–2, p. 8.
- Architecture and Nature**—Huggins. 1852–3, p. 199.
- Arch of Titus**—Duckworth. 1862–3, p. 142.
- Armour ; History of English**—Pidgeon. 1845–6, p. 23, and *ib.*, p. 28.
- Armour-plated Ships of War**—E. J. Reed. 1862–3, p. 29.
- Arsenic ; On the detection of minute quantities of**—Dr. Brett. 1844, p. 26.
- Artefacta Antiquissima**—Duckworth. 1859–60, p. 163.
- Artificial Formation of Organic Compounds**—Brown. 1869–70, p. 48.
- Art, On ; in relation to Social Life**—Statham. 1870–1, p. 93.
- Arts ; the Development of, by War**—J. Boulton. 1853–4, p. 58.
- Astronomy, Meteoric**—Sephton. 1868–9, p. 87.

- Astronomy of the Chaldeans—Collingwood. 1858-9, p. 192.  
 Atmospheric Perturbations and Explosions of Fire-damp in Coal Mines—  
 Dobson. 1859-60, p. 217.  
 Aurora; Observations on—Walker. 1860-1, p. 102.  
 Australia; its Geographical Peculiarities—Dr. Inman. 1845-6, p. 12.  
 Australian Aborigines—Dr. Inman. 1845, p. 18.

## B

- Beautiful, The; on the nature and influence of—S. Huggins. 1849-50, p. 80.  
 Bee; Fungus Parasitic—Higgins. 1857-8, p. 160.  
 Beet-root Sugar—Baruchson. 1864-5, p. 233.  
 Bentley, Thomas; Biographical Sketch of. 1850-1, p. 190.  
 Birds; Local—Brockholes. 1859-60, p. 115. See *Ornithology*.  
 Birds; Local—Brockholes. 1860-1, p. 17.  
 Birds, The Notes of—Collingwood. 1860-1, p. 200.  
 Birds which nest in this district—Brockholes. 1859-60, p. 115. Part II.  
 1860-1, p. 17.  
 Body; What is?—Faram. 1849-50, p. 85.  
 Borough; The Old English—Birchall. 1865-6, p. 15.  
 Bosworth Battlefield—Brooke. 1856-7, p. 30.  
 Botanical characters—Sansom. 1849-50, p. 107.  
 Botany; Notes on local stations for—Higgins. 1857-8, p. 65.  
 Botany; On the Phytotype of Flowers (theory of leaves)—Dr. Nevins.  
 1859-60, p. 78.  
 Brown, Sir William; Proceedings with relation to. 1860-1, p. 89.  
 British Association at Liverpool; On some of the Natural History Excursions  
 of the. 1857-8, p. 35.  
 British Seas; Zoology of—McAndrew. 1844-5, p. 89.  
 Building Societies; Arithmetic of—Gray. 1863-4, p. 110.  
 Butterflies; Rearing of—Brockholes. 1857-8, p. 176.

## C

- Capital and Secondary Punishments—Rev. W. L. Clay. 1868-9, p. 147.  
 Capital Punishment—Dr. Inman. 1849-50, p. 72.  
 Capital Punishment—Rev. J. Robberds. 1846-7, p. 121.  
 Causation; Theory of—Kirkman. 1861-2, p. 112.  
 Cephalopoda, Recent—T. J. Moore. 1860-1, p. 197.  
 Chameleon; Habits of. Note. 1858-9, p. 67.  
 Character; On the Feminine—W. Kennedy-Moore. 1869-70, p. 139.  
 Charcoal (Animal)—E. Holden. 1861-2, p. 61.  
 Charge to Grand Jury at York (1620), Oct. 15. 1849, p. 16.  
 Chemistry in relation to other Sciences—Davies. 1866-7, p. 191.  
 Chemistry of the Plant and of the Animal—Davies. 1869-70, p. 126.  
 China; Communication with Western—Duckworth. 1860-1, p. 51.  
 Chironomus Plumosus; Natural History of—Higginson. 1865-6, p. 174.

- Chloroform—Dr. Waldie. 1847-8, p. 40.  
 Choetopterus; New Species—Williams. 1863-4, p. 147.  
 Christianity and the Roman Matrimonial Law—Retslag. 1857-8, p. 123.  
 Chromo Lithography and Picture Printing—Marples. 1867-8, p. 193.  
 Circle-sailing—Townson. 1853-4, p. 66.  
 Circulation in the Closed Cells of Plants—Inman. 1847-8, p. 26.  
 Civilisation, Continuity in—Samuelson. 1868-9, p. 167.  
 Classical Languages; On the Study of the—Ihne. 1861-2, p. 27.  
 Classical Studies; their true value in Education—Rev. Joshua Jones.  
 1864-5, p. 97.  
 Coal Measures, Local—Morton. 1860-1, p. 193.  
 Coal Vegetation—Archer. 1856-7, p. 143.  
 Coffees—H. S. Evans. 1852-3, p. 140.  
 Coleridge; his Writings and Influence—J. C. Redish. 1865-6, p. 209.  
 Colour Patterns in Natural Productions—Higgins. 1856-7, p. 133.  
 Commerce, English; Post-Elizabethan—J. B. Yates. 1846-7, p. 83.  
 Compass; Deviations of—Townson. 1852-3, p. 192.  
 Continuity in Civilisation, &c.—Samuelson. 1868-9, p. 167.  
 Contributions to British Ornithology; The Notes of Birds—Collingwood.  
 1860-1, p. 200.  
 Copper Ores—Samuelson. 1856-7, p. 71.  
 Coral Plant—Dr. Watson. 1844, p. 82.  
 Corals; On the Stony—Higgins, 1859-60, p. 230.  
 Correlation and Conservation of Physical Force, &c.—Edwards. 1858-9,  
 p. 152.  
 Criminal Responsibility—Whittle. 1867-8, p. 80.

D

- Deer; British Fallow—Brooke. 1859-60, p. 37.  
 Dialect, the Lancashire—Picton. 1864-5, p. 17.  
 Dictionary of a Nation; On the, as illustrating National Character—Nevins.  
 1864-5, p. 195.  
 Directions for preparing Specimens of Natural History, &c. See 2nd  
 Appendix to 1861-2.  
 Dredging Excursion—McAndrew. 1855-6, p. 51.  
 Duality of Geometrical Relations—Dr. Booth. 1847-8, p. 117.  
 Dublin, British Association at; Rambles in the neighbourhood—Archer.  
 1857-8, p. 35.

E

- Earthquake of 1852—Smith. 1852-3, p. 137.  
 Earth-Temperature, note on—Walker. 1860-1, p. 142.  
 Education, Compulsory—Flueck. 1866-7, p. 203.

- Education Department, Social Science Congress at Belfast—Baruchson. 1867-8, p. 102.
- Education of the Mercantile Class—Lamport. 1848-9, p. 72.
- Education, Physical, &c.—Balman. 1846-7, p. 88.
- Education, The true value of the Classics in—Rev. Joshua Jones. 1864-5, p. 97.
- Egypt and Nubia, Climate of—Dickman. 1857-8, p. 195.
- Egyptian Antiquities, Note on. 1863-4, p. 144.
- Elephants, The, used by the Carthaginians in war—Brooke. 1859-60, p. 8.
- Emblems, Books of—J. B. Yates. 1848-9, p. 8; 1849-50, p. 117.
- Emigration of Orphans—Hayward. 1869-70, p. 246.
- England's Feudal Possessions on the Continent—Birchall. 1869-70, p. 104.
- English Alphabet, History of the—Inman. 1870-1, p. 191.
- English Derivations from Sanskrit Roots—Picton. 1863-4, p. 31.
- English Grammar, Notes on—Ihne. 1862-3, p. 78.
- English Language, On the—Picton. 1868-9, p. 52.
- English Painting—Barber. 1848-9, p. 87.
- Entomological Ramble to the Sandhills of New Brighton and Leasowe—Brockholes. 1856-7, p. 115.
- Engraving, History of—Ginsburg. 1862-3, p. 130.
- Essenes, The—Ginsburg. 1862-3, p. 181.
- Euclid, The Unsuitableness of, as a Text Book—Rev. Joshua Jones. 1869-70, p. 59.

## F

- Fauna, Historical, Lancashire and Cheshire—Collingwood. 1863-4, p. 151.
- Fauna, the Ancient of Lancashire and Cheshire—Collingwood. 1862-3, p. 104.
- Fauna; The Liverpool. Appendix to 1853-4.
- Faust and Hamlet—Baar. 1861-2, p. 135.
- Feminine Character, On the—W. Kennedy-Moore. 1869-70, p. 139.
- Fernando Po—Hutchinson. 1856-7, p. 124.
- Feudal Peasantry in England, on the Condition of the—Birchall. 1864-5, p. 60.
- Feudal Possessions of England on the Continent—Birchall. 1869-70, p. 104.
- Fiction, on the Nature and Influence of Modern Works of—Dr. Hume. 1844-5, p. 18.
- Filatahs, Anthropology of—Hutchinson. 1854-5, p. 44.
- Fine Art, its Relations and Tendencies—S. Huggins. 1851-2, p. 50.
- Fire and Fire Making, a Chapter in the History of Civilisation—Newton. 1867-8, p. 225.
- Fire-damp, its relations to Atmospheric Perturbations—Dobson. 1859-60, p. 217.
- Flora; The Liverpool. I. Appendix to 1850-1. II. Appendix to 1854-5.
- Flora and Fauna, Local—Higgins. 1858-9, p. 6.
- Flora and Fauna, Additions to Local. 1859-60, p. 32.

- Flora and Fauna, Local Habitat. 1860-1, p. 8. 1861-2, p. 10.  
 Flora and Fauna of Geological Systems—Morton. 1857-8, p. 163.  
 Force, On the Meaning of the Word—Mott. 1870-1, p. 123.  
 Force, Physical, &c.—J. B. Edwards. 1858-9, p. 152.  
 Foreign Eyes in England—Flueck. 1868-9, p. 195.  
 Fossils ; Medusa  
     Foot (?)  
     Web foot  
     Reptile foot  
     } 1847-8, p. 129, *et seq.*  
 Fotheringay, Visit to—Brooke. 1858-9, p. 52.  
 French Frontiers ; an Historical Review of Territorial Changes in France—  
     Birchall, with Maps. 1870-1, p. 241.  
 Fungi—Higgins. 1856-7, p. 109.  
 Fungi of Shells—Higgins. 1857-8, p. 227.  
 Fungi of Bees—Higgins. 1857-8, p. 160.  
 Fungi, Local—Higgins. Appendix to 1857-8, p. 55.

G

- Gasteromycetes ; British—Higgins. 1858-9, Appendix.  
 Geometrical Relations, Duality of—Dr. Booth. 1847-8, p. 117.  
 Geographical Distribution of Testaceæ—McAndrew. 1853-4, p. 8.  
 Geographical Knowledge, the, of the Elizabethan age—Birchall. 1867-8, p. 8.  
 Geographical Names—Dr. Hume. 1849-50, p. 40.  
 Geology, Local ; Map, Flint to Huyton—Cunningham. 1844-5, p. 1.  
 Geology, The, of Stourton—Dr. Hume. 1845-6, p. 52.  
 Geology of Liverpool, &c., with reference to Water Supply—Cunningham,  
     1846-7, p. 58.  
 Geology, Local ; New Red Sandstone, &c.—G. H. Morton. 1855-6, p. 69.  
 Geology, A Ramble, by Bretherton. 1855-6, p. 148.  
 Geology of Perim Island—Duckworth. 1857-8, p. 142.  
 Geology, Flora and Fauna, of—G. H. Morton. 1857-8, p. 163.  
 Geology, Ice-action, Local—G. H. Morton. 1859-60, p. 35.  
 Geology, Local, Keuper and other Sandstones—G. H. Morton. 1859-60,  
     p. 148.  
 Geology in its relation to Primeval Man (Artefacta Antiquissima)—Duck-  
     worth. 1859-60, p. 163.  
 Geology, Coal Measures, Local—G. H. Morton. 1860-1, p. 193.  
 Geology of Windsor, Liverpool—Elliot. 1863-4, p. 9.  
 Geology of the Coast of Aberdeenshire—Ferguson. 1864-5, p. 162.  
 Geology of Rainhill—Higgins. 1866-7, p. 64.  
 Geology, Submarine Forest, Leasowe—Dr. Hume. 1844-5, p. 97.  
 Geology, Section, from Flintshire to Huyton—Cunningham. 1844-5, p. 108.  
 Geology, Raised Beaches : Frith of Clyde, &c.—Ferguson. 1853-4, p. 131.  
 Geology, Coal Fossils—T. C. Archer. 1856-7, p. 143.  
 Geology, An account of some of the Italian Volcanoes—Inman. 1856-7,  
     p. 147.

- Geology, The Stony Corals—Higgins. 1859-60, p. 230.  
 Geology, The Ancient Fauna of Lancashire and Cheshire—Collingwood. 1862-3, p. 104.  
 Genealogy—Dr. Hume. 1846-7, p. 75.  
 Genius, Characteristics of, &c.—Robberds. 1859-60, p. 97.  
 Geysers, Explanation of—E. J. Reed. 1862-3, p. 148.  
 Gothic Architecture—Rimmer. 1847-8, p. 52.  
 Gothic Language, the Ancient, &c.—Pictou. Part I, 1861-2, p. 81.  
 Do. Part II, in its relation to other Indo-European Tongues. 1862-3, p. 37.  
 Graminaceæ, The—T. C. Archer. 1855-6, p. 107.  
 Gun-Cotton—Edwards. 1864-5, p. 220.  
 Gyroscope, The—Nevins. 1862-3, p. 71.

## H

- Hairs (of Plants)—Inman. 1847-8, p. 26.  
 Hairs, Natural History, &c., of—Inman. 1851-2, p. 83.  
 Hairs, Plates for this second paper. 1851-2, p. 219.  
 Hall's, Bishop, *Mundus alter et idem*—Yates. 1844-5, p. 41.  
 Hamilton's, Sir W., Philosophy—Clark. 1860-1, p. 227.  
 Hamlet and Faust—Baar. 1861-2, p. 135.  
 Heat, Water, and Steam—Banister. 1860-1, p. 150.  
 Hepaticæ, Local—Marratt. 1859-60, Appendix.  
 Historical Parallel between the British Parliament and Roman Senate—Ihne. 1850-1, p. 156.  
 Historic Errors and Doubts, &c.—Jeffery. 1868-9, p. 115.  
 Hobbes, Life and Character of—A. Ramsay. 1853-4, p. 159.  
 Homomorphism—Collingwood. 1859-60, p. 181.  
 Horace's Ode, *In Archytam*—Ihne. 1856-7, p. 46.  
 Horrocks, J. (the Astronomer), Note on. 1858-9, p. 5.  
 Horrocks, J., Monument to. 1859-60, p. 237.  
 Hoyle, Antiquities found at—Dr. Hume. 1845-6, p. 53.  
 Hugh, Sir, of Lincoln—Dr. Hume. 1848-9, p. 40.  
 Humour, Characteristics of, &c.—Robberds. 1859-60, p. 97.  
 Hymenomycetes; British—Higgins. Appendix to 1857-8.

## I

- Ice-action, near Liverpool—G. H. Morton. 1859-60, p. 85.  
 Indo-European Races—Dr. Turnbull. 1844-5, p. 78.  
 Infant Mortality—Balman. 1845-6, p. 47.  
 Infection, Suggestions as to the Possible Lurking Places for, in our Houses and our Towns—Higginson. 1866-7, p. 58.  
 Intellectualty of the Lower Animals—Dr. Hume. 1847-8, p. 59.  
 Do. Dr. Warwick. Do. p. 76.

- Inscriptions, Greek, at Blundell—J. B. Yates. 1852-3, p. 135.  
 Insects, on the Feet of—Dr. Inman. 1850-1, p. 179, 199, and 209.  
 Iron Ships, Deviation of Compass on board—Towson. 1852-3, p. 192.

J

- Janus, his Attributes and Worship—Ihne. 1852-3, p. 143.  
 Jubilee Festival of the Society. 1861-2, p. 207.  
 Jurisprudence, &c., at the Social Science Congress at Belfast. 1867-8, p. 102.

K

- Kabbalah, The—Ginsburg. Appendix to Vol. for 1864-5.  
 Karaites, The; or Bible Jews of Europe—Ginsburg. 1861-2, p. 155.  
 Kattiawar, Personal Reminiscences of the Peninsula of—Kent. 1870-1, p. 225.  
 Keuper Formation in Wirral and South West of Lancashire—G. H. Morton. 1859-60, p. 148.  
 "King-Maker;" An outline of the life of the Earl of Warwick, commonly called the—Brooke. 1857-8, p. 16.  
 Kraken; Sea Serpent—Heath. 1864-5, p. 68.

L

- Lancashire and Cheshire, The Ancient Fauna of—Collingwood. 1862-3, p. 104.  
 Lancashire and Cheshire, The Historical Fauna of—Collingwood. 1863-4, p. 151.  
 Lancashire (South) Dialect—Picton. 1864-5, p. 17.  
 Land and Water, on the Proportion of, &c.—Yates. 1861-2, p. 16.  
 Land Tenure among the Romans—Ihne. 1851-2, p. 28.  
 Language, the Ancient Gothic: and its place in the Indo-European family—Picton. 1861-2, p. 81.  
 Language, the Ancient Gothic; in its relation to other Indo-European Tongues—Picton. 1862-3, p. 37.  
 Language of St. Matthew's Gospel, The original—Dr. Newton. 1865-6, p. 51.  
 Languages, On the Study of the Classical and Modern—Ihne. 1861-2, p. 27.  
 Laws of the Society, Vol. for 1848-9.  
 Lead, the Action of Liverpool Water upon—Nevins. 1856-7, p. 128.  
 Leaves, The Causes of the Fall of—Dr. Inman. 1847-8, p. 89.  
 Legislature, The, of the Roman Republic—Ihne. 1850-1, p. 232.  
 Leguminosæ—T. C. Archer. 1853-7, p. 64.  
 Lepidoptera, Marco—Brockholes. 1857-8, p. 176.  
 Lepidoptera of Wirral—Brockholes. Appendix to 1863-4.  
 Lichens, Local—Marrat. 1859-60, Appendix.



- Life; Animal and Vegetable—Dr Inman. 1849-50, p. 113.  
 Life Insurance, as an Investment—Nevins. 1860-1, p. 67.  
 Light, the Magnetic—Edwards. 1859-60, p. 134.  
 Literature, Popular English—Dr. Hume. 1851-2, p. 23.  
 Liverpool, Speculations on the former Topography of—Boulton. 1870-1,  
 p. 11.  
 Livingstone, Dr., Address to. 1856-7, p. 76.  
 Local Improvements—Boulton. 1848-9, p. 117.  
 Longevity in England—Balman. 1863-4, p. 67.  
 Lower Animals; Do they feel pain?—Dr. Inman. 1847-8, p. 94.  
 Luminosity of Worms—Harrison. 1861-2, p. 109.

## M

- Macbeth—Dr. Hume. 1852-3, p. 166.  
 Macbeth, Lady; an Apology for—Rathbone. 1861-2, p. 69.  
 Magnetic Light—J. B. Edwards. 1859-60, p. 135.  
 Mammalia; Products of, and Uses to which applied—Archer. 1858-9,  
 p. 238.  
 "*Man; The Proper Study of mankind is*"—Higgins. 1859-60, p. 147.  
 Manuscripts, Ancient—J. B. Yates. 1851-2, p. 59.  
 Margaret of Anjou—Brooke. 1858-9, p. 13.  
 Marine Animals of the Mersey Shore—J. B. Edwards. 1858-9, p. 229.  
 Marine Dredging—McAndrew, 1847-8, p. 80.  
 Marine Zoology—McAndrew. 1844-5, p. 89.  
 Marine Zoology; Explanation of Specimens—McAndrew. 1845-6, p. 11.  
 Marco Lepidoptera, On Rearing—Brockholes. 1857-8, p. 177.  
 Massorah, The, newly discovered MSS., &c.—Ginsburg. 1868-9, p. 281.  
 Matrimonial Law, Roman and Christian—Retslag. 1857-8, p. 123.  
 Matthew, St., Gospel of; an Enquiry into the Original Language of—  
 Newton. 1865-6, p. 51.  
 Meat, Preservation of—Hamilton. 1855-6, p. 138.  
 Meat, Supply from abroad—Hutchinson. 1870-1, p. 63.  
 Mercantile Marine; Suggestions to the. Second Appendix, 1861-2.  
 Mercantile Marine; their Opportunities of advancing Science—Collingwood.  
 1861-2, p. 46.  
 Meteor of 27th November, 1862—Horner. 1862-3, p. 65.  
 Do. of 5th December, 1863, with Map—Alex. S. Herschel. 1863-4, p. 101.  
 Meteorological Observations—Hartnup. Appendices, No. 2, 1850-1 and  
 1852-3.  
 Meteors, and Meteoric Astronomy—Sephton. 1868-9, p. 87.  
 Migration of Swallows—Brooke. 1858-9, p. 123.  
 Migratory Habits of Birds—Collingwood. 1858-9, p. 128.  
 Mill's Critique on Sir W. Hamilton's Philosophy—Rev. E. Mellor. 1865-6,  
 p. 142.  
 Mill's Theory of the Character and Proofs of Mathematical Doctrines—  
 Rev. S. H. Byrth. 1862-3, p. 27.

- Mill's Theory of Causation—Kirkman. 1861-2, p. 112.  
 Milton's *Paradise Lost*—Ihne. 1853-4, p. 94.  
 Mind, The Influence of, on the Molecular Forces of Matter—Nevins. 1868-9, p. 9.  
 Modern Languages; On the Study of the Classical and—Ihne. 1861-2, p. 26.  
 Molecular Forces of Matter, Influence of Mind upon the—Nevins. 1868-9, p. 9.  
 Mollusca, Distribution of Testaceous, in the North-east Atlantic, &c.—McAndrew. 1853-4, p. 8.  
 Money, Principles of—Faram. 1847-8, p. 6.  
 Morphology—Nevins. 1859-60, p. 78.  
 Mosses; Cultivation of—Higgins. 1855-6, p. 45.  
 Mosses; Structure of, &c.—Sansom. 1848-9, p. 126.  
 Mother Tongue, Our, and its Congeners—Picton. 1868-9, p. 52.  
 Motion; Voluntary and Involuntary—Dr. Inman. 1846-7, p. 34.  
 Muggletonians, Origin of the—Gordon. 1868-9, p. 247.  
 Muggletonians, Ancient and Modern—Gordon. 1869-70, p. 186.  
*Mundus alter et idem.* (Bishop Hall)—J. B. Yates. 1844-5, p. 41.  
 Musci and Hypaticæ, Local—Marrat. 1854-5, p. 61.

N

- Narcotics—Turnbull. 1845-6, pp. 33-6, 39-46.  
 Nature and Influence of the Beautiful—Huggins. 1849-50, p. 80.  
 Nautical Science, Contributions to—Dobson. 1859-60, p. 119.  
 Nile Exploration; Literature of—A. J. Mott. Vol. for 1866-7, p. 145.  
 Nineveh and Babylon; the Astronomy of the ancient Chaldeans regarded as an Exponent of the recently discovered Monuments—Collingwood. 1858-9, p. 192.  
 Notes, The, of Birds—Collingwood. 1860-1, p. 200.  
 Nursery Tales, as illustrating and forming National Character—Dr. Nevins. 1866-7, p. 23.  
 Nuttall, Thomas, F.L.S., Obituary Note—Higgins. 1859-60, p. 2.

O

- Odour; the Phenomenon of—T. C. Archer. 1854-5, p. 12.  
 Old English Borough, The, and its Inhabitants—Birchall. 1865-6, p. 15.  
 Organic Compounds; their Artificial Formation—Brown. 1869-70, p. 48.  
 Organic Representative Form: Homomorphism—Collingwood. 1859-60, p. 181.  
 Organs of Locomotion in the Radiata; on the Development of—Sweetlove. 1844-5, p. 12.  
 "Origin of Species" (Darwin's)—Higgins. 1860-1, p. 42.  
 "Origin of Species" (Agassiz)—Collingwood. 1860-1, p. 81.  
 "Origin of Species" (Darwin's)—Higgins, *bis*. 1860-1, p. 135.

- Ornithology; Local (Brockholes)—Part I., 1859-60, p. 115; Part II., 1860-61, p. 17.  
 Ornithology; The Notes of Birds—Collingwood. 1860-1, p. 200.  
 Ornithology; Migration—Collingwood. Part I. 1858-9, p. 128. Part II. 1861-2, p. 172.  
 Ornithology; Migration of Swallows—Brook. 1858-9, p. 123.  
 Orphans; Emigration of—Hayward. 1869-70, p. 246.  
 Other, Either, or Whether—Picton. 1862-3, p. 139.  
 Our Meat Supply from abroad—Hutchinson. 1870-1, p. 63.

## P

- Pain; Do the Lower Animals feel?—Inman. 1847-8, p. 94.  
 Palmaceæ, The—T. C. Archer. 1855-6, p. 19.  
 Paper, used for Printing and Writing—J. B. Yates. 1847-8, p. 47.  
 Paraguayan War; a short Account of some Incidents of—Hutchinson. 1870-1, p. 79.  
 Parana Indians; with some Episodes of the Paraguayan War—Hutchinson. 1868-9, p. 23.  
 Parsees; Religion of the—Dadabhai Naoroji. 1860-1, p. 159.  
 Pembroke; Jasper, Earl of, in the fifteenth century, and his remarkable change of fortune—J. T. Danson. 1855-6, p. 111.  
 Perim Island, Fossils of—Duckworth. 1857-8, p. 142.  
 Persiac Odes—Behrend. 1850-1, p. 234.  
 Petherick's Nile Expedition. 1860-1, p. 157.  
 Phenomena of the Age—Rev. J. S. Jones. 1867-8, p. 47.  
 Philology; Comparative—Ramsay, 1852-3, p. 175.  
 Philology; Comparative—see Picton's Sanskrit Roots and English Derivations. 1863-4, p. 30, and other papers by this author.  
 Philology; an Enquiry into the Origin and Relations of the Antique Dialects formerly spoken in the Baronies of Forth and Bargey, County Wexford—Picton, 1866-7, p. 118.  
 Philological and Ethnological Enquiries; on the use of Proper Names in—Picton. 1865-6, p. 181.  
 Philology; the Ancient Gothic Language, &c.—Picton, 1861-2, p. 81. Part II., 1862-3, p. 37.  
 Philosophy of Geographical Names—Hume. 1849-50, p. 40.  
 Photography—Dr. Edwards. 1854-5, p. 16.  
 Physical Geography of Liverpool and Wirral—Dickinson. 1850-1 (Appendix).  
 Phytotype or Archetype of the Flowering Division of the Vegetable Kingdom—Nevins. 1859-60, p. 78.  
 Picture Printing—Marples. 1864-5, p. 80.  
 Picture Printing and Chromo Lithography—Marples. 1867-8, p. 193.  
 Pillar Stones and Stone Circles—Inman. 1866-7, p. 85.  
 Plant, Chemistry of the, and the Animal—Davis, 1869-70, p. 126.  
 Plants; Hairs of—Inman. 1847-8, p. 26.

- Poetry and Common Life—Robberds. 1855-6, p. 29.  
 Poetry, Characteristics of, &c.—Robberds, 1859-60, p. 97.  
 Poetry, the Fugitive, of the present day—Bloxam. 1848-9, p. 76.  
 Poison in Confectionery—Brett. 1845-6, p. 37.  
 Potatoe Disease—Baines. 1845-6, p. 2. 1846-7, p. 28.  
 Preservation of Meat—Hamilton, 1855-6, p. 139.  
 Preservation of Meat—Hutchinson. 1870-1, p. 68.  
 Presidents' Addresses—  
     J. B. Yates, F.S.A., &c. 1844-5, p. 1.  
     Dr. Booth, F.R.S. 1846-7, p. 6.  
         Do. Valedictory. October 15, 1849-50, p. 12.  
     Dr. Ginsburg, Inaugural. 1866-7, p. 10.  
     McAndrew, R., Valedictory. 1856-7, p. 14.  
     T. Inman, M.D., Inaugural. 1856-7, p. 18.  
     Higgins, Rev. H. H., M.A., do. 1859-60, p. 12.  
         Do. (Jubilee), History of the Society. Appendix to 1861-2, p. 19.  
         Do. Valedictory. 1862-3, p. 8.  
     Dr. Ihne, Inaugural. 1862-3, p. 13.  
     J. A. Picton, F.S.A., Inaugural. 1863-4, p. 13.  
     Dr. Nevins, Inaugural. 1869-70, p. 9.  
         Do. Inaugural. 1870-1, p. 1.  
 Pritchard's Researches in the Physical History of the Indo-European  
     Races; an Analysis of—Dr. Turnbull. 1844-5, p. 78.  
 Proverbs, Semitic—Benas. 1868-9, p. 228.  
 Punishments, Capital and Secondary—Rev. W. L. Clay. 1868-9, p. 147.

R

- Radiated Animals, Organs of Locomotion of—Sweetlove. 1844-5, p. 12.  
 Rainhill, Notes on the Local, Natural, and Geological History of—Higgins,  
     1866-7, p. 64.  
 Raised Beaches, Clyde—Dr. Dickinson. 1853-4, p. 130.  
 Religion of the Parsees—Dadabhai Naoroji. 1860-1, p. 159.  
 Rheno-Danubian Barrier of Roman Empire—Yates (Corresponding Member).  
     1852-3, p. 152.  
 Rhysimeter, for shewing the Speed of Currents of Water—Fletcher. 1870-1.  
     p. xlvi.  
 Right and Wrong—Dr. Commins. 1862-3, p. 68.  
 Roman History, Regal Period of—Ihne. 1852-3, p. 156.  
 Roman Land Tenure—Ihne. 1851-2, p. 28.  
 Roman Matrimonial Law—Retslag. 1857-8, p. 123.  
 Roman Republic, Legislature of—Ihne. 1850-1, p. 233.  
 Roman Roads in North-west of England—Howson. 1861-2, p. 181.  
 Roman Senate and English Parliament—Ihne. 1850-1, p. 156.  
 Rosse, Lord, Telescope of—Dr. Hume. 1844-5, p. 109.  
 Rotating Discs (Experiments).—Higginson. 1863-4, p. 98.  
 Rotatory Motion—Hamilton. 1857-8, p. 49.

## S

- Sabæan Origin of Winged Lion and Bull—Rev. St. Vincent Beechy. 1849-50, p. 19.
- Sandhills, Ramble among—Brockholes. 1856-7, p. 115.
- Sanskrit Roots and English Derivations—Picton. 1863-4, p. 31.
- Saxons in England, Traces of the—Picton. 1849-50, p. 89.
- Sea Level, Changes of the—Picton. 1848-9, p. 113.
- Sea Serpent—(Heath). 1844-5, p. 68.
- Seeds, Vitality of. 1850-1, p. 176; also, p. 237.
- Semitic Proverbs—Benas. 1868-9, p. 228.
- Shells, Fungus on—Higgins. 1857-8, p. 227.
- Shakspeare's, *Lady Macbeth*—P. H. Rathbone. 1861-2, p. 69.
- Shakspeare's *Merchant of Venice*—Ihne. 1860-1, p. 123.
- Shaksperian Drama; its Moral Dignity—Foard. 1857-8, p. 75.
- Singing, The, of Birds—Collingwood. 1860-1, p. 200.
- Social Life among the early Teutonic Races—Picton. 1867-8, p. 68.
- Socrates, his Character and Moral Influence—Robberds. 1850-1, p. 180.
- Solar Eclipse of 1851. 1851-2, p. 4.
- Song-birds, the British—Collingwood. 1860-1, p. 200.
- Speculations on the Former Topography of Liverpool and its Neighbourhood—Boulton. 1870-1, p. 11.
- Sphærobolus Stellatus—Higgins. 1856-7, p. 51.
- St. Bernard, the Hospice of; a Personal Narrative—Dr. H. Taylor. 1845-6, p. 31.
- Steam, on a new Theory of the Generation of—E. J. Reed. 1862-3, p. 148.  
Adjourned discussion; p. 175.
- Stimulants and Narcotics, on the habitual employment of—Dr. Turnbull. 1845-6, p. 38.
- Stone Circles, &c.—Inman. 1866-7, p. 85.
- Stone Implements—Hume. 1862-3, p. 34.
- Stony Corals—Higgins. 1859-60, p. 230.
- Storm in which the "Royal Charter" was lost—Dobson. 1860-1, p. 56.
- Storms, British—Stevenson. 1852-3, p. 209.
- Stourton, Geology of—Dr. Hume. 1845-6, p. 52.
- Street Architecture—Huggins. 1848-9, p. 144.
- Subjects, not included in the Proceedings, as published. See Vol. 1844-5, p. xiv.
- Submarine Forest at Leasowe—Hume, et Soc. 1844-5, p. 97.
- Surnames, History and Meaning of—Ramsay. 1854-5, p. 25.
- Swallow, the Migrations of the—Brooke. 1858-9, p. 123.

## T

- Taste, Standards of—J. Boulton. 1851-2, p. 109.
- Teas—H. S. Evans. 1851-2, p. 119.
- Telescope, Lord Rosse's; Discoveries made with—Dr. Hume. 1844-5, p. 109.

- Temperature in Great Britain—Elliot. 1858-9, p. 168.  
 Temperature of the Earth—Walker. 1860-1, p. 142.  
 Tennyson's *Maud*—J. C. Redish. 1855-6, p. 131.  
 Testaceous Mollusca, &c.—McAndrew. 1853-4, p. 8.  
 Teutonic Races in early times; their Social Life—Pictou. 1867-8, p. 68.  
 Theosophic Ideas of the East—W. Kennedy-Moore. 1867-8, p. 148.  
 Tiberius Emperor, a Plea for—Ihne. 1855-6, p. 77. 1856-7, p. 76.  
 Titus, the Arch of—Duckworth. 1862-3, p. 142.  
 Tonnage, Metrical System for Ships—1856-7, p. 122.

U

- Umbelliferae—Archer. 1858-9, p. 79.  
 Universities, our—McMullen. 1870-1, p. 171.  
 Uranus, Satellites of—W. Lassell. 1851-2, p. 20.

V

- Van-Vondel, Life and Writings of—Fischel. 1853-4, p. 145.  
 Ventilation of the Chimney, &c.—Nesbit. 1848-9, p. 101.  
 "Vestiges of Creation," Remarks on the Theory advanced in—Dr. Hume.  
 1844-5, p. 37. Adjourned—p. 39.  
 Vitality—Higgins. 1863-4, p. 75.  
 Vital Temperature—Dr. Carson. 1846-7, p. 41.  
 Volcanoes of Italy—Ihne. 1856-7, p. 147.  
 Voltaic Currents and their Therapeutic Application—J. B. Edwards. 1850-1,  
 p. 203.  
 Voluntary and Involuntary Motion—Inman. 1846-7, p. 34.

W

- Warwick, Earl of, "King Maker"—Brooke. 1857-8, p. 16.  
 Water, its Action upon Lead—Nevins and Edwards. 1856-7, p. 129.  
 Water, On the Excess of, in the region of the earth about New Zealand, its  
 Causes and Effects—J. Yates, M.A., &c. 1861-2, p. 14.  
 Water-supply, Geological Conformation of the Neighbourhood of Liverpool,  
 with reference to—Cunningham. 1846-7, p. 58.  
 Western China, best Route to. 1860-1, p. 50.  
 Winged Lion, &c., of Nineveh, Origin of—Beechy. 1849-50, p. 19.  
 Wit, Humour, Poetry and Genius. 1859-60, p. 97.  
 Wolves in England—Brooke. 1856-7, p. 53.  
 Words and their Derivatives—see Dr. Nevins' paper. 1864-5, p. 195.



## PART II.

### INDEX OF AUTHORS.

#### A

**ARCHER, T. C. ;**

- On certain new Vegetable Products. 1854-5, page 54.
- On the Natural History Excursions of the British Association. 1857-8, p. 35.
- On the Natural Products of the Leguminosæ. 1856-7, p. 64.
- On the Phenomenon of Odour. 1854-5, p. 12.
- Products of the Mammalian Animals, and Uses to which they are applied. 1858-9, p. 238.
- On the Useful Products of the Graminaeæ. 1855-6, p. 107.
- On the Useful Products of the Palmaceæ. *Ib.*, p. 19.
- On the Useful Products of the Umbelliferæ. 1858-9, p. 79.
- On Vegetable Organisms found in Coal. 1856-7, p. 143.

#### B

**BAAR, Rev. H., Ph. D. ;**

- On Hamlet and Faust. 1861-2, p. 135.

**BAINES, THOMAS ;**

- On the Potato Disease. 1845-6, p. 2.
- On the Effects it is likely to produce. 1846-7, p. 23.

**BALMAN, THOMAS, M. D. ;**

- On Infant Mortality. 1845-6, p. 47.
- On Physical Education. 1846-7, p. 88.
- Longevity in England. 1863-4, p. 67.

**BANISTER, Rev. W., B. A. ;**

- Heat, in its relation to Water and Steam. 1860-1, p. 150.

**BARBER, CHARLES ;**

- On English Painting. 1848-9, p. 87.

**BARUCHISON, A. ;**

- Jurisprudence and Education, at the Belfast Social Science Congress, 1867-8, p. 102.
- On the History and Progress of the Manufacture of Beet-root Sugar. 1864-5, p. 233.

**BEECHY, Rev. ST. VINCENT ;**

- Sabæan Origin of the Winged Lions and Bulls of Nineveh. 1849-50, p. 19.

#### B



- BENAS, BARON LOUIS ;**  
 On Semitic Proverbs. 1868-9, p. 228.
- BENTLEY, THOMAS ;**  
 Biographical Sketch. 1850-1, p. 190.
- BIRCHALL, JAMES ;**  
 On the Condition of the Feudal Peasantry in England. 1864-5, p. 60.  
 French Frontiers ; an Historical Review of Territorial Changes in France. 1870-1, p. 241.  
 On the Feudal Possessions of England on the Continent. 1869-70, p. 104.  
 On the Geographical Knowledge of the Elizabethan Age. 1867-8, p. 8.  
 The old English Borough and its Inhabitants. 1865-6, p. 15.
- BLOXAM, Mr. ;**  
 The Fugitive Poetry of the present day. 1848-9, p. 76.
- BOOTH, Rev. JAMES, LL.D., F.R.S., M.R.I.A., &c. ;**  
 President's Address. 1846-7, p. 4.  
 Valedictory Address. 1849-50, p. 12.  
 Duality of Geometrical Relations. 1847-8, p. 117.
- BOULT, JOSEPH ;**  
 On Local Improvements. 1848-9, p. 117.  
 On Standards of Taste. 1851-2, p. 109.  
 On the most marked Development of the Arts promoted by War. 1853-4, p. 58.  
 Speculations on the Former Topography of Liverpool and the Neighbourhood. 1870-1, p. 11.
- BRETT, R. H., Ph.D., F.L.S. ;**  
 On the detection of minute quantities of Arsenic, and of distinguishing it from other Metals, especially in reference to Medico-legal Inquiries. 1844-5, p. 26.  
 Note on Poisonous Confectionery. 1845-6, p. 37.
- BRETHERTON, E., F.G.S. ;**  
 Geological Ramble. 1855-6, p. 148.
- BROCKHOLES, J. F. ;**  
 An Entomological Ramble to the Sandhills of New Brighton, &c. 1856-7, p. 115.  
 On rearing Marco Lepidoptera. 1857-8, p. 176.  
 On the Birds which nest in the district. 1859-60, p. 115. Part II., 1860-1, p. 17.  
 On the Lepidoptera of the Hundred of Wirral. Appendix to 1863-4.
- BROOKE, RICHARD, F.S.A. ;**  
 Visit to Bosworth. 1856-7, p. 30.  
 On Jasper, Earl of Pembroke. 1855-6, p. 111.  
 On the Extinction of Wolves in England. 1856-7, p. 53.  
 On the Earl of Warwick, "King Maker." 1857-8, p. 16.  
 On the Life and Character of Margaret of Anjou. 1858-9, p. 13.  
 On the Elephants used in war by the Carthaginians. 1859-60, p. 8.  
 On the Fallow Deer of Great Britain. 1859-60, p. 37.

- BROOKE, RICHARD, F.S.A. ;—continued.**  
 On the Migration of Swallows. 1858-9, p. 123.  
 Visit to Fotheringay. 1858-9, p. 52.  
**BROWN, J. C., D.Sc., F.C.S. ;**  
 On the Artificial Formation of Organic Compounds. 1869-70, p. 48.  
**BROWN, Sir WILLIAM ;**  
 Proceedings with relation to. 1860-1, p. 39.  
**BYERLEY, ISAAC, F.L.S., &c. ;**  
 Fauna of Liverpool. Appendix to, 1853-4.  
 On *Trachinus Draco*, Otter, Pike, &c. 1848-9, p. 156.  
**BYRTH, Rev. S. H. ;**  
 On Mr. Mill's Theory of the Character and Proofs of Mathematical Doctrines. 1862-3, p. 27.

C

- CARSON, JAMES, M.D. ;**  
 On Vital Temperature. 1846-7, p. 41.  
**CLARKE, CHARLES ;**  
 The Philosophy of Sir W. Hamilton. 1860-1, p. 227.  
**CLAY, Rev. W.'L. ;**  
 On Capital and Secondary Punishments. 1868-9, p. 147.  
**COLLINGWOOD, C., and Dr. EDWARDS ;**  
 Local Fauna. 1858-9, p. 11.  
**COLLINGWOOD, C., M.A., M.B., &c. ;**  
 Local Fauna. 1858-9, p. 10.  
 Comparison between Ancient and Modern Views of the Migration and Habits of Birds. 1858-9, p. 128.  
 On the Astronomy of the Ancient Chaldeans, regarded as an Exponent of the recently discovered Monuments of Nineveh and Babylon. 1858-9, p. 192.  
 Additions to Local Fauna. 1859-60, p. 32.  
 On Homomorphism. 1859-60, p. 181.  
 On Agassiz' Views of Darwin's theory. 1860-1, p. 81.  
 Contributions to British Ornithology ; the Notes of Birds. 1860-1, p. 200.  
 Contributions to British Ornithology, No. 2 (Migration and Migratory Birds). 1861-2, p. 172.  
 On the Opportunities of advancing Science enjoyed by the Mercantile Marine. 1861-2, p. 46.  
 The Ancient Fauna of Lancashire and Cheshire. 1862-3, p. 104.  
 The Historical Fauna of Lancashire and Cheshire. 1863-4, p. 151.  
**COMMINS, ANDREW, LL.D. ;**  
 Right and Wrong. 1862-3, p. 68.  
**CUNNINGHAM, JOHN, F.G.S. ;**  
 Geology of Liverpool with reference to Water Supply. 1846-7, p. 58.  
 Map, Geology of the District. 1844-5, p. 1. Section do., p. 108.

## D

- DAVIES, E., F.C.S.;  
 Chemistry in relation to other Sciences. 1866-7, p. 191.  
 Chemistry of the Plant and of the Animal. 1869-70, p. 126.  
 Alchemy. 1867-8, p. 177.
- DICKINSON, JOSEPH, M.A., M.D., F.L.S., &c.;  
 Flora of Liverpool. Part I., 1850-1. Part II., Appendix to, 1854-5.  
 Egypt and Nubia as a Winter Residence. 1857-8, p. 195.
- DOBSON, T., B.A.;  
 On the Relation between Atmospheric Perturbations and Explosions of  
 Fire Damp in Coal Mines. 1859-60, p. 217.  
 On the "Royal Charter" storm. 1860-1, p. 56.  
 Contributions to Nautical Science. 1860-1, p. 119.
- DUCKWORTH, H., F.R.G.S., F.G.S.;  
 On the Fossils of Perim Island. 1857-8, p. 142.  
 Artefacta Antiquissima; Geology in its relation to Primeval Man.  
 1859-60, p. 163.  
 On Communication with Western China. 1860-1, p. 51.  
 The Arch of Titus. 1862-3, p. 142.

## E

- EDWARDS, J. B., F.C.S.;  
 On Induced Voltaic Currents, &c. 1850-1, p. 202.  
 On Photography. 1854-5, p. 16.  
 On the Correlation and Conservation of Physical Force, &c. 1858-9,  
 p. 152.  
 The Marine Animals of the Mersey Shore. 1858-9, p. 229.  
 On Magnetic Light. 1859-60, p. 134.  
 On Gun Cotton. 1864-5, p. 220.
- EDWARDS, J. B., F.C.S., and Dr. NEVINS;  
 On the Action of Liverpool Water on Lead. 1856-7, p. 129.
- ELLIOT, JAMES, Prof.;  
 Local Peculiarities of Temperature. 1858-9, p. 168.
- EVANS, H. S.;  
 On the Teas of Commerce. 1851-2, p. 119.  
 On the Coffees do. 1852-3, p. 141.
- EVANS, H. S., and NEWTON SAMUELSON;  
 On Adulteration of Food. 1855-6, p. 117.

## F

- FARAM, J.;  
 On Money. 1847-8, p. 6.  
 On the Nature and Essence of Body. 1849-50, p. 85.  
 On the Power that Organises and Animates. 1851-2, p. 115.

- FERGUSON, WILLIAM, F.G.S., F.L.S., &c. ;**  
     On the Raised Beaches of the Frith of Clyde, &c. 1853-4, p. 131.  
     On the Geology of the Coast of Aberdeenshire. 1864-5, p. 162.
- FISCHEL, Rev. A. ;**  
     Life and Writings of Joost Van-Vondel. 1853-4, p. 145.
- FLETCHER, ALFRED E., F.C.S. ;**  
     Description of an Anemometer capable of measuring the speed of Air  
         in heated flues, or places where corrosive vapours are found.  
         1869-70, p. 31.  
     Rhysimeter, for showing the Speed of Currents of Water. 1870-1,  
         p. xlv.
- FOARD, J. T. ;**  
     On the Moral Dignity of the Shakspearian Drama. 1857-8, p. 75.
- FLUECK, C. ;**  
     Compulsory Education. 1866-7, p. 203.  
     Foreign Eyes in England. 1868-9, p. 195.

G

- GINSBURG, Rev. C. D., LL.D. ;**  
     The Karaites ; their History and Literature. 1861-2, p. 155.  
     The Essenes. 1862-3, p. 181.  
     The History of Engraving. 1862-3, p. 130.  
     The Kabbalah. Appendix to 1864-5, (pp. 1, 165).  
     Researches into the Massorah, &c. 1868-9, p. 281.
- GORDON, Rev. A., M.A. ;**  
     Origin of the Muggletonians. 1868-9, p. 247.  
     On the Ancient and Modern Muggletonians. 1869-70, p. 186.  
     A Pythagorean of the Seventeenth Century. 1870-1, p. 277.
- GRAY, J. McFARLANE ;**  
     Arithmetic of Building Societies. 1864-4, p. 110.
- HAMILTON, G., F.C.S., F.R.A.S. ;**  
     On the Preservation of Fresh Meat. 1855-6, p. 138.  
     On the Composition of Rotary Motion. 1857-8, p. 49.
- HARTNUP, JOHN, F. R. A. S. ;**  
     Meteorological Observations. 1850-1, p. 199 ; p. 235, Appendix II  
     Time Balls and Sympathetic Clocks. 1852-3, p. 132.
- HAYWARD, J. W., M.D., M.R.C.S., &c. ;**  
     The Emigration of Orphans. 1869-70, p. 246.
- HEATH, E. ;**  
     On the Sea Serpent. 1844-5, p. 68.
- HERSCHEL, ALEX. S. ;**  
     On a Meteor, Dec. 5, 1863 ; wit a Plate 1863-4, p. 101

**HIGGIN, EDWARD;**

On the History of Door-fastening. 1849-50, p. 84.

**HIGGINS, Rev. H. H., M.A., F.O.P.S.;**

Local Flora, Catalogue. 1858-9, p. 6.

British Gasteromycetes. 1858-9. Appendix.

Inaugural Address. 1859-60, p. 12.

Natural History Notes at Soirée. 1859-60, p. 28.

On *The Proper Study of Mankind is Man*. 1859-60, p. 142.

On the Stony Corals. 1859-60, p. 230.

On Darwin's Origin of Species. 1860-1, p. 42. Part II., p. 135.

On the Cultivation of Mosses. 1855-6, p. 45.

On the Sphærobolus Stellatus. 1856-7, p. 51.

On the Study of the Fungi. 1856-7, p. 109.

On Colour Patterns in Natural Productions. 1856-7, p. 133.

Notes on some of the principal Stations for Botanising in the neighbourhood of Liverpool. 1857-8, p. 65.

On a Parasitic Fungus of the Bee. 1857-8, p. 160.

On a Fungus on Shells. 1857-8, p. 227.

British Hymenomycetes. Appendix to 1857-8.

President's Address at the Jubilee Festival. History of the Society, &c. 1861-2, p. 19.

Valedictory Address. 1862-3, p. 8.

On Vitality. 1863-4, p. 75.

Notes on the Local, Natural, and Geological History of Rainhill. 1866-7, p. 64.

**HIGGINSON, A., M.R.C.S.;**

Experiments with Rotating Discs. 1863-4, p. 98.

Natural History of Chironomus Plumosus. 1865-6, p. 57.

On Lurking Places for Infection in Dwellings and Towns. 1866-7, p. 57.

**HOLDEN, ERASMUS;**

On Animal Charcoal. 1861-2, p. 61.

**HORNER, H. P.;**

On Architectural Criticism. 1851-2, p. 8.

Note on a Meteor, 27th Nov. 1862. 1862-3, p. 65.

**HORROCKS, J. (the Astronomer);**

Note on. 1858-9, p. 5.

**HOWSON, Rev. J. S., D.D.;**

On the Study of Ancient Art as an Instrument of Education. 1850-1, p. 229.

High Street and the Roman Roads in the North-west of England, 1861-2, p. 131.

**HUGGINS, SAMUEL;**

On Street Architecture. 1848-9, p. 144.

On Fine Art, its Tendencies, &c. 1851-2, p. 50.

On the Beautiful. 1849-50, p. 80.

Architecture and Nature. 1852-3, p. 199.

**HUME, Rev. A., LL.D., D.C.L., F.S.A., &c. ;**

- On the Nature and Influence of Modern Works of Fiction. 1844-5, p. 18.
  - On the Theory advanced in "Vestiges of the Natural History of Creation." 1844-5, p. 37.
  - On the Submarine Forest, Leasowe. 1844-5, p. 97.
  - On Recent Discoveries made with Lord Rosse's Larger Telescope. 1844-5, p. 109.
  - On the Geology of Stourton. 1845-6, p. 52.
  - On the Antiquities found at Hoylake. 1845-6, p. 53.
  - On Genealogy. 1846-7, p. 75.
  - On the Intellectuality of the Lower Animals. 1847-8, p. 59.
  - Sir Hugh of Lincoln. 1848-9, p. 40.
  - On the Philosophy of Geographical Names. 1849-50, p. 40.
  - On the Advancement of Literature in Liverpool. 1850-1, p. 197.
  - Notes on English Popular Literature. 1851-2, p. 22.
  - "Who was Macbeth?" 1852-3, p. 166.
  - The Doctor's "Notice" to the Council. 1854-5, p. 9.
  - On Stone Implements, Ancient and Modern. 1862-3, p. 34.
- HUTCHINSON, T. J., F.R.G.S., F.R.S.L., F.E.S., F.A.S.L., &c., &c. ;**
- Anthropology of the Filatahs. 1854-5, p. 44.
  - On the Parana Indians and Paraguayan War. 1868-9, p. 28.
  - Our Meat Supply from Abroad. 1870-1, p. 63.
  - A short Account of some Incidents of the Paraguayan War. 1870-1, p. 79.
  - Facts about Fernando Po. 1856-7, p. 124.

I

**IHNE, WM., Ph.D. ;**

- Historical Parallel between the British Parliament and Roman Senate. 1850-1, p. 156.
- On the Legislature of the Roman Republic. 1850-1, p. 232.
- On the Tenure of Land amongst the Romans. 1851-2, p. 28.
- On the True Mythological Conception of Janus, his Attributes and Worship. 1852-3, p. 143.
- On Accounts of the Regal Period of Roman History. 1852-3, p. 156.
- On Milton's *Paradise Lost*. 1853-4, p. 94.
- A Plea for the Emperor Tiberius. 1855-6, p. 77. Part II., 1856-7, p. 76.
- On Horace's Ode, *In Archytam*. 1856-7, p. 46.
- On International Arbitration. 1857-8, p. 119.
- On Shakespeare's *Merchant of Venice*. 1860-1, p. 123.
- On the Study of the Classical and Modern Languages. 1861-2, p. 26.
- President's Inaugural Address. 1862-3, p. 13.
- Notes on English Grammar. 1862-3, p. 78.

**INMAN, THOS., M.D.;**

- On the Geographical and other peculiarities of Australia. 1845-6, p. 12.
- On the Aborigines of Australia. 1845-6, p. 18.
- On Voluntary and Involuntary Motion. 1846-7, p. 34.
- On the Circulation in the Closed Cells and Lymphatic Hairs of Plants. 1847-8, p. 26.
- On the Causes that determine the Fall of Leaves. 1847-8, p. 89.
- On the Feeling of Pain in the Lower Animals. 1847-8, p. 94.
- On the Punishment of Death in cases of Murder. 1849-50, p. 72.
- On the Distinction between Animal and Vegetable Life. 1849-50, p. 113.
- On the Feet of Insects. 1850-1, pp. 179, 199, 209.
- On Hair. 1851-2, p. 83.
- President's Inaugural Address. 1856-7, p. 18.
- An Account of some of the Volcanoes of Italy. 1856-7, p. 147.
- Adaptability to altered circumstances, an Attribute of Life. 1859-60, p. 63.
- On the Antiquity of certain Christian and other Names. 1865-6, p. 113.
- On Pillar Stones, Stone Circles, &c. 1866-7, p. 85.
- History of the English Alphabet. 1870-1, p. 191.

**J****JEFFERY, F. J.;**

- Historic Errors and Doubts, &c. 1868-9, 115.

**JONES, Rev. JOSHUA, M.A.;**

- On the true value of the Classics in Education. 1864-5, p. 97.
- On the Unsuitableness of Euclid as a Text-book of Geometry. 1869-70, p. 59.

**JONES, Rev. J. S.;**

- On Certain Phenomena of the Age. 1867-8, p. 47.

**K****KENT, W. K.;**

- Personal Reminiscences of the Peninsula of Kattiawar. 1870-1, p. 224.

**KENNEDY-MOORE, Rev. W., M.A.;**

- On Certain Theosophic Ideas of the East. 1867-8, p. 148.
- On the Feminine Character. 1869-70, p. 139.

**KIRKMAN, Rev. T. P., M.A., F.R.S., &c.;**

- On a so-called Theory of Causation. 1861-2, p. 112.

**L****LASSELL, W., F.R.S., F.R.A.S.;**

- On two new Satellites of Uranus. 1851-2, p. 20.

**M****MARPLES, DAVID;**

- On Picture Printing. 1864-5, p. 80.
- Chromo Lithography, 1867-8, p. 193.

**MARRAT, F. P. ;**

Local Hepatics and Lichens. 1859-60. Appendix.

Local Flora. 1858-9, p. 8.

On the Musci and Hypaticæ found within twelve miles of Liverpool and Southport. Appendix to 1854-5, p. 61.

**McANDREW, ROBERT ;**

An Account of some Zoological Researches made in the British Seas during the summer of 1844. 1844-5, p. 89.

On some Specimens of Marine Zoology. 1845-6, p. 10.

On Marine Dredging. 1847-8, p. 80.

On the Distribution of Testaceous Mollusca in the North Eastern Atlantic, &c. 1853-4, p. 8,

Notes on a Dredging Excursion, North Cape. 1855-6, p. 51.

Valedictory Address. 1856-7, p. 14.

**McMULLEN, Rev. J. A. ;**

Our Universities. 1870-1, p. 171.

**MELLOR, Rev. ENOCH, D.D. ;**

An Examination of some of the points in Mr. Mill's Critique of the Philosophy of Sir W. Hamilton. 1865-6, p. 142.

**MOORE, T. J., F.Z.S. ;**

Recent Cephalopoda. 1860-1, p. 197.

**MORTON, G. H., F.G.S., F.R.G.S.I. ;**

On the Sub-divisions of the New Red Sandstone between the river Dee and the 'Up-throw' of the coal Measures east of Liverpool. 1855-6, p. 68.

Flora and Fauna of Geology. 1857-8, p. 163.

Traces of Icebergs near Liverpool. 1859-60, p. 35.

On the Basement Bed of the Kenper, 1859-60, p. 148.

On the Coal Measures of Liverpool, &c. 1860-1, p. 198.

**MOTT, A. J. ;**

On the Literature of Expeditions to the Nile. 1866-7, p. 145.

On the meaning of the word Force. 1870-1, p. 123.

**N**

**NAOROJI, DADABHAI ;**

The Religion of the Parsees. 1860-1, p. 159.

**NEVINS, J. B., M.D., and J. B. EDWARDS, F.C.S., &c. ;**

On the Action of Liverpool Water upon Lead. 1856-7, p. 129.

**NEVINS, J. B. ;**

On the Phytotype of Flowers, &c. 1859-60, p. 78.

Life Insurance as an Investment, 1860-1, p. 66.

On some Phenomena of the Gyroscope. 1862-3, p. 71.

The Dictionary of a Nation illustrative of National Character. 1864-5, p. 193.

On Nursery Tales, as illustrating and forming National Character. 1866-7, p. 23



NEVINS, J. B. ;—*continued.*

On the Influence of Mind upon the Molecular Forces of Matter.  
1868-9, p. 9.

President's Inaugural Address. 1869-70, p. 9.

President's Inaugural Address. 1870-1, p. 1.

## NEWTON, JOHN, M.R.C.S. ;

An Inquiry into the Original Language of St. Matthew's Gospel.  
1865-6, p. 51.

Fire and Fire-making ; a Chapter in the History of Civilisation.  
1867-8, p. 225.

## NISBET, W. ;

On the Ventilation of the Chimney, &c. 1848-9, p. 101.

## P

## PICTON, J. A., F.S.A. ;

On the Lancashire Dialect. 1864-5, p. 17.

On traces of the settlement of the Saxons in England. 1849-50, p. 89.

The Ancient Gothic Language, and its place in the Indo-European  
family. 1861-2, p. 81. Part II., 1862-3, p. 37.

Other, Either, or Whether. 1862-3, p. 139.

President's Inaugural Address. 1863-4, p. 13.

On Sanskrit Roots and English Derivations. 1863-4, p. 31.

On the use of Proper Names in Philological and Ethnological Enquiries.  
1865-6, p. 181.

On the Antique Dialect of Forth and Bargey, Wexford. 1866-7, p. 118.

Social Life among the Teutonic Races in early times. 1867-8, p. 68.

Our Mother Tongue and its Congeners. 1868-9, p. 52.

On Changes of the Sea Level, &c. 1848-9, p. 113.

## PIDGEON, H. C. :

On English Armour. 1845-6, p. 23.

## R

## RAMSAY, Rev. A., M.A. ;

On the practical applications of Comparative Philology. 1852-3, p. 174.

The Life and Character of Hobbes. 1853-4, p. 159.

On Surnames. 1854-5, p. 25.

## RATHBONE, P. H. ;

An Apology for Shakspeare's Lady Macbeth. 1861-2, p. 69.

## REDISH, J. C. ;

On some of the Mental and Social Phenomena of the day, with their  
poetical solution, as illustrated by Tennyson's *Maud*. 1855-6,  
p. 131.

On the Writings and Influence of Coleridge. 1865-6, p. 209.

## REED, E. J., M.I.N.A., Chief Constructor, &amp;c. ;

On Armour Plated Ships of War. 1862-3, p. 29.

On a new theory of the generation of Steam, with an explanation of  
the Geysers of Iceland. 1862-3, p. 148.

- RETSLAG, CARL, Ph.D.;**  
 On the Influence of Christianity on the Roman Matrimonial Law.  
 1857-8, p. 123.
- RIMMER, ALFRED;**  
 On Gothic Architecture, its Associations, and fitness for Ecclesiastical  
 Purposes. 1847-8, p. 52.
- ROBBERDS, Rev. J., B.A.;**  
 On Capital Punishment. 1846-7, p. 121.  
 On Socrates. 1850-1, p. 180.  
 Poetry and Common Life. 1855-6, p. 29.  
 Characteristics of Wit, Humour, &c. 1859-60, p. 97.

S

- SAMUELSON, JAMES;**  
 Continuity in Civilisation, as illustrated by the connection between  
 our own culture and that of the ancient world. 1868-9, p. 167.
- SAMUELSON, NEWTON, and H. S. EVANS;**  
 On the Adulteration of Food. 1855-6, p. 117.
- SAMUELSON, NEWTON;**  
 On the Production of Copper from its Ores. 1856-7, p. 71.
- SANSOM, THOMAS, A.L.S., F.B.S.E.;**  
 The Structure, &c., of Mosses. 1848-9, p. 126.  
 On Botanical Characters. 1849-50, p. 107.
- SEPHTON, Rev. JOHN, M.A.;**  
 Meteors, &c. 1868-9, p. 87.
- SMITH, J. P. G.;**  
 On the Recent Earthquake. 1852-3, p. 137.
- STATHAM, H. H.;**  
 On Art, in relation to Social Life. 1870-1, p. 93.
- STEVENSON, W.;**  
 On British Storms. 1852-3, p. 209.
- SUTTON, Mr.;**  
 On Agricultural Statistics. 1846-7, p. 95.
- SWEETLOVE, Mr.;**  
 On the Development of Organs of Locomotion in the Radiated Animals.  
 1844-5, p. 14.

T

- TAYLOR, R. HIBBERT, M.D.;**  
 An Excursion to Mount St. Bernard. 1845-6, p. 30.
- TOWSON, J. T.;**  
 On the Deviation of the Compass on board Iron Steamers, &c.  
 1852-3, p. 192.  
 On Great Circle Sailing. 1853-4, p. 66.
- TURNBULL, JAMES, M.D.;**  
 An Analysis of Dr. Pritchard's Researches in the Physical History of  
 the Indo-European Races. 1844-5, p. 78.  
 On the habitual use of Stimulants. 1845-6, p. 33. Part II., p. 39.

## W

## WALDIE, DAVID ;

On Chloroform. 1847-8, p. 40.

## WALKER, DAVID, M.D., F.R.G.S., M.R.I.A., F.L.S. ;

Observations on Aurora. 1860-1, p. 102.

Notes on Earth Temperature. 1860-1, p. 142.

## WHITTLE, EWING, M.D., M.R.I.A. ;

Criminal Responsibility. 1867-8, p. 30.

A Visit to the Republic of Andorra, with Map. 1870-1, p. 39.

## WILLIAMS, GEORGE ;

Solar Eclipse of 1851. 1851-2, p. 4.

## WILLIAMS, JOHN ;

A new Species of Chaetopterus. 1863-4, p. 147.

## Y

## YATES, J. B., F.S.A., M.R.G.S., F.P.S. ;

President's Address. 1844-5, p. 1.

On Bishop Hall's *Mundus alter et idem*. 1844-5, p. 41.

On English Commerce at the death of Queen Elizabeth. 1846-7, p. 83.

On the Paper used for Printing and Writing. 1847-8, p. 47.

On Books of Emblems. 1848-9, p. 8. 1849-50, p. 150.

On Antient MSS., the method of preparing, &c. 1851-2, p. 59.

On two Greek Inscriptions at Ince Blundell. 1852-3, p. 134.

On the Advantages to be derived from the adoption of the Metrical  
Ton, of 1,000 kilogrammes, in the Measurement of Ships.  
1856-7, p. 122.

## YATES, JAMES, M.A., F.R.S., &amp;c., (Corresponding Member ;)

The Rheno-Danubian Barrier of the Roman Empire. 1852-3, p. 152.

On the Excess of Water in the region of the earth about New Zealand ;  
its Causes and its Effects. 1861-2, p. 14.

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